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MOTOR AGE

ROAD RACING PERFORMANCES OF THE YEAR

By C. G. SINSABAUGH

ROAD racing statistics compiled from Motor Age files for the season of 1909 show that this branch of motor competition is growing in popularity among the makers in the United States, who have given it more support than ever before and with correspondingly better results in that foreign competition has been successfully met and the American stock car has, in a majority of cases, triumphed over the foreign product. In this country this year there have been twenty-seven road races, counting the various class events, and in these 223 cars have started. Of this number eighteen of them have been of foreign make, yet the tables fail to show only one victory for an imported machine—that of the Fiat in one of the classes at the Riverhead, L. I. As against this, the Fiat started eight times, getting one first, two seconds and one third. The Isotta ran four times and was placed only once. The Benz got one second and was unplaced once, while the Renault was unplaced in its only start. The Mercedes started three times without results.

LOUIS CHEVROLET

GEORGE ROBERTSON

BERT DINGLEY

HARRIS HANSHUE

JOE MATSON

Not Many Foreign Races

Abroad they did not support road racing as in former years because of the pact into which many of the leading makers entered. As a result the eight races that were run were for small cars. However, it is more than possible that in 1910 the foreigners will reënter the racing game, there being talk of a revival of the French grand prix.

Interesting comparisons may be drawn between 1908 and 1909. In 1908 there were twenty-one road races in this country as against twenty-six in 1909. In 1908 the total distance of the twenty-one American races was 4,814.4 miles, or an average of 229.2 miles per race. In 1909 the twenty-seven races distanced 5,100 miles, or an average of 211 miles. Abroad in 1908 the nine events contested made a total distance of 2,736 miles, or an average of 304 miles per race, while in 1909 the total distance for eight races was 1,747 miles, or an average of 218.5 miles.

In this country sixty different makes of cars took part in the twenty-seven road races and the first places were divided among fourteen different makes. Abroad the Lion-Peugeot was the star, winning five of the eight races. In the United States it was a battle royal for supremacy between the Chalmers-Detroit and the Buick, which concerns were the strongest supporters of road events among the American makers. A compilation of results would seem to give the honors to the Chalmers, which started twenty-two cars in the various events and came home first in five, finished second three times and third twice. This left twelve cars unplaced. The Buick record shows twenty-

BILLY KNIPPER, CHALMERS DRIVER

ROAD-RACING STATISTICS OF 1909

Number of road races	27
Number of miles	5,100
Average distance of each race	211
Average miles per hour each race	49.2
Fastest road race, Riverhead, class 4	69.9
Slowest road race, Los Angeles-Phoenix	24.8
Longest road race, Los Angeles-Phoenix	480
Shortest road race, Portland	43.8
Number of starters	223
Average number of starters	8 1-4
Number of cars allowed to finish	94

ARTHUR SEE, A MAXWELL WINNER

seven starts, of which number five were firsts, two seconds and two thirds. The Pope-Hartford was the dark horse of the year, and its four first places were gathered on the Pacific coast, the most sensational of which was the Portola meet, in which it won the little class at an average pace of 65.7 miles per hour. The Chalmers' best performance was in the Wemme cup at Portland, Ore., where Dingley averaged 58.7 miles per hour in a 40. The best record for a Chalmers 30 was in the Massapequa cup on Long Island, when Joe Matson averaged 58.5.

The Buick has to its credit the fastest road race of the year, both in this country and abroad—the 69.9 miles per hour of Chevrolet at Riverhead, not to forget his fast lap in the Vanderbilt in which he averaged 76.5 miles per hour. The Simplex has a most excellent record, having won twice and only started four cars. Apperson had ten chances, and besides two firsts was in the money three other times. Maxwell, while it won only one race, was a consistent performer and the speed of the little car was well demonstrated. The Stoddard, which quit the racing game after Indianapolis, did well earlier in the year and out on the coast annexed a fast race. The Alco made only two starts and won one of them—the Vanderbilt. In the other, at Lowell, it looked a victory when Grant got to the front and with only three laps to go, when a tire came off and caught in the driving chain.

Glancing over the list of also rans one discovers there are thirty-five makes and fifty-four cars which failed to get inside the money, but in justice to these it might be explained that, with one or two exceptions, the cars were entered by owners or agents, and did not get the support of the factory.

Also Rans that Finished

In the accompanying tables those makes of cars which finished one, two or three are so labeled, while the others are put in the unplaced division. This might lead one to suppose that such cars did not finish, whereas there are twenty-three of them that caught the judges' eyes but which do not come in this category. Four of the Stoddards marked unplaced completed their races; there were two Buicks and two Maxwells, and in addition one each of the Sharp-Arrow, Chadwick, Palmer & Singer, Stearns, Locomobile, Mar-

AVERAGES MADE BY ALL CARS FINISHING IN 1909 ROAD RACES IN TWENTY-SEVEN AMERICAN CONTESTS

M.P.H.	Dis.	Car	Driver	Race
69.6	113.7	Buick	Chevrolet	Riverhead
65.7	148.2	Pope-Hartford	Fleming	Portola
64.4	202	Apperson	Hanshue	Ferris
64.3	113.7	Buick	Burman	Riverhead
63.7	254.1	Pope-Hartford	Fleming	Portola
63.6	136.5	Sharp-Arrow	Sharp	Riverhead
62.8	278	Alco	Grant	Vanderbilt
62.4	211	Apperson	Hanshue	Portola
62.4	227.5	Fiat	De Palma	Riverhead
61.5	254.1	Apperson	Hanshue	Portola
61.5	278	Fiat	Parker	Vanderbilt
61.1	202	Chadwick	Seibel	Ferris
60.9	182	Palmer-Singer	Lescault	Riverhead
60.7	202	Stearns	Free	Ferris
60.2	202	Locomobile	Page	Ferris
59.7	189.6	Marmon	Harroun	Wheatley
59.2	202	Stoddard-Dayton	Siefert	Ferris
58.79	102.2	Chalmers-Detroit	Dingley	Wemme
58.76	102.2	Stoddard-Dayton	Christofferson	Wemme
58.5	126.4	Chalmers-Detroit	Matson	Massapequa
57.6	202	Studebaker	Lord	Ferris
57.2	43.8	Pope-Hartford	Arnold	Portland
56.9	202	Franklin	Hamlin	Ferris
56.5	211	Lozier	Michener	Portola
56.4	254	Lozier	Michener	Portola
55.7	202	Pope-Hartford	Scott	Ferris
55.7	43.8	Cadillac	Covey	Portland
55.7	43.8	Stoddard-Dayton	Christofferson	Portland
55.5	212	Buick	Burman	Vesper
55.4	200	Simplex	Robertson	Fairmount
55.3	43.8	Chalmers-Detroit	Dingley	Portland
55.2	43.8	Stoddard-Dayton	Christofferson	Portland
55.2	202	Chalmers-Detroit	Dingley	Portland
55.2	102.2	Locomobile	Page	Wemme
54.3	202	Stoddard-Dayton	Stoddard-Dayton	Shettler
54.2	318	Simplex	Robertson	Lowell
54.2	202	Chalmers-Detroit	Dingley	Fairmount
53.8	91	Maxwell	See	Riverhead
52.5	148.2	Autocar	Morris	Portola
52.4	212	Benz	Stoecker	Vesper
52.3	91	Maxwell	Costello	Riverhead
52.3	202	Buick	Nikrent	Shettler
52.2	200	Apperson	Harding	Fairmount
52.06	212	Chalmers-Detroit	Dingley	Vesper
51.6	318	Isotta	Poole	Lowell
51.5	212	Buick	Strang	Vesper
51.4	200	Chadwick	Parkin	Fairmount
51.4	232.7	Chalmers-Detroit	Matson	Indiana
51.3	127.2	Chalmers-Detroit	Knipper	Merrimack
51.3	200	Isotta	Strang	Fairmount
51.1	202	Maxwell	Smith	Shettler
51.07	126.4	Maxwell	Doorley	Massapequa
51	150	Buick	Chevrolet	Yorick
50.9	212	Sharp-Arrow	Sharp	Vesper
50.4	126.4	Maxwell	See	Massapequa
50.	232.7	Locomobile	Robertson	Indiana
49.9	126.4	Hudson	Ainslee	Massapequa
49.9	318	Fiat	Parker	Lowell
49.9	395.6	Buick	Chevrolet	Cobe
49.5	232.7	Marion	Monsen	Indiana
49.4	318	Buick	Burman	Lowell
49.1	395.6	Knox	Bourque	Cobe
48.09	318	Renault	Basle	Lowell
48	395.6	Locomobile	Robertson	Cobe
47.55	127.2	Maxwell	See	Merrimack
47.4	232.7	Locomobile	Florida	Indiana
47.4	232.7	Stoddard-Dayton	Wiseman	Indiana
47.2	395.6	Fiat	Hearne	Cobe
46.9	232.7	Moon	Wells	Indiana
46.9	395.6	Stoddard-Dayton	Englebeck	Cobe
46.4	127.2	Maxwell	Costello	Merrimack
45.95	150	Buick	Harroun	Yorick
45.9	50	Stoddard-Dayton	Noonan	Santa Rosa
44.4	50	Stevens-Duryea	Onthank	Santa Rosa
44.3	127.2	Chalmers-Detroit	Matson	Merrimack
43.3	127.2	Buick	Disbrow	Merrimack
42.8	50	Stoddard-Dayton	Wiseman	Santa Rosa
42.6	127.2	Maxwell	Sickenger	Merrimack
41.8	50	Acme	Sheets	Santa Rosa
40.3	91	Buick	Finch	Riverhead
39.8	127.2	Chalmers-Detroit	Gelnau	Merrimack
38.8	43.8	Auburn	Cohen	Portland
35.2	50	Tourist	Ely	Santa Rosa
33.1	290	Colburn	McMillan	Denver
32.9	290	Moon	Brinker	Denver
32.2	290	Chalmers-Detroit	Matson-Knipper	Denver
30.9	93	Pope-Hartford	Reuss	Mount Baldy
24.8	480	Buick	Nikrents	Desert race
20.3	480	Columbia	Stone	Desert race
20.2	480	E-M-F	Lord	Desert race
17.1	480	Kisselkar	Hanshue	Desert race

STARTING AND FINISHING

Event	No. starters	No. finishers
Vanderbilt	15	2
Cobe cup	12	5
Fairmount Park	21	5
Lowell cup	17	5
Santa Rosa	13	6
Denver	6	3
Ferris cup	15	8
Wemme cup	13	3
Portola cup, class 3	7	3
Indiana trophy	16	6
Wheatley Hills	4	1
Massapequa cup	6	4
Shettler cup	9	4
Merrimack	9	7
Yorick cup	6	2
Riverhead, class 1	5	1
Riverhead class 2	2	1
Riverhead, class 3	1	1
Riverhead, class 4	3	2
Riverhead, class 5	5	3
Portland, class 2	3	3
Portland, class 3	3	3
Vesper cup	8	5
Mount Baldy	3	2
Portola, class 1	9	2
Portola, class 2	5	2
Los Angeles-Phoenix	9	5

H. F. Grant, Alco, Vanderbilt Winner

RECORD OF DRIVERS IN 1909

Driver	First	Second	Third	Unplaced
Dingley	2	3	1	1
Robertson	2	1	1	0
Chevrolet	3	0	0	4
Hanshue	2	2	0	1
Matson	2	0	0	2
Grant	1	0	0	1
Fleming	2	0	0	1
Harroun	1	1	0	0
Knipper	1	0	0	3
Burman	1	1	0	3
De Palma	1	0	0	1
See	1	1	1	0
Parker	0	1	1	0
Harding	0	0	1	1
Costello	0	1	1	1
Michener	0	1	1	0
Doorley	0	1	0	1
Haupt	0	0	0	2
Seymour	0	0	0	3
Lytle	0	0	0	3
Strang	0	0	0	6

mon, Chalmers-Detroit, Studebaker, Franklin, Isotta, Hudson, Renault, Acme, Tourist and Kisselkar.

There are fifteen cars in the mile-a-minute class, divided among ten different makes. The Apperson figures in this class three times and the Buick, Pope-Hartford and Fiat twice each; the Alco, Chadwick, Palmer & Singer, Stearns and Locomobile figure once each.

The only foreign event approaching a big-car race was the Targa Florio, which was run in Sicily, and in which the S. P. A. and Fiat were the contenders. Even then the owners themselves drove and there was only a minute's difference between the two. The Ostende cup and the Liederkerke trophy races were only side shows, and the remaining contests were participated in by the voiturettes. It was here that the remarkable part of the foreign year comes in, for in these five races the Lion-Peugeot made a clean sweep. Four of these victories were achieved by the single-cylinder and the other by a twin. Guippone won three of them and was second in another, while the fastest race abroad was the Normandie cup, which Boillot won in a Lion-Peugeot, averaging 65.4 miles an hour for 208 miles, a most remarkable performance.

Leading American Drivers

When it comes down to a discussion of the stars of the American road-racing world for 1909 the limelight focuses on a very few—Dingley, Robertson, Chevrolet, Hanshue, Grant, Matson, Harroun, Knipper, Burman and young See. In the race for supremacy it is hard to pick one who is head and shoulders above the rest, as was the case last year, when Strang had them all beaten in number of races won. However, it would seem as if Bert Dingley and George Robertson are entitled to the most credit for their fine work. Perhaps, if anything, Dingley should be favored, for he has driven in seven races this year, of which number he has won two, been second three times and third once. Only once did he fail to finish. The dope shows that his fastest race was the Wemme cup, in which he averaged 58.7 miles per hour, and his slowest performance was in the Vesper cup, in which he was third at 52.06 miles per hour. Robertson started only four times. Two of these times he won—at Lowell and at Philadelphia. He was sec-

HOW THE CARS WERE PLACED

Make of car	First	Second	Third	Unplaced
Chalmers-Detroit	5	3	2	12
Buick	5	2	2	18
Pope-Hartford	4	0	0	4
Simplex	2	0	0	2
Apperson	2	2	1	5
Maxwell	1	3	2	5
Fiat	1	2	1	4
Stoddard-Dayton	1	2	2	6
Alco	1	0	0	1
Palmer & Singer	1	0	0	1
Marmon	1	0	0	2
Cadillac	1	0	0	2
Sharp-Arrow	1	0	0	1
Colburn	1	0	0	1
Locomobile	0	1	2	4
Lozier	0	1	1	3
Stevens-Duryea	0	1	0	2
Isotta	0	1	0	3
Benz	0	1	0	1
Chadwick	0	1	0	2
Knox	0	1	0	7
Columbia	0	1	0	4
Moon	0	1	0	3
Autocar	0	1	0	0
Stearns	0	0	1	6
E-M-F	0	0	1	0
Marion	0	0	1	2
Auburn	0	0	1	0

The following have started in road races this year but have failed to finish one, two, three: American, 4; Selden, 1; Thomas, 3; Acme, 1; Welch, 1; Rainier, 2; Overland, 1; White, 4; Atlas, 1; Renault, 1; Allen-Kingston, 1; Mitchell, 1; Regal, 1; Studebaker, 4; Durocar, 1; Franklin, 4; Premier, 1; Haynes, 1; Rambler, 1; Corbin, 1; Hudson, 1; Mercedes, 3; National, 2; Acme, 1; Tourist, 1; Speedwell, 1; Comet, 2; Packard, 1; Oldsmobile, 1; Sunset, 1; Kisselkar, 1; Elmore, 1; Pennsylvania, 1; Dorris, 1; Ford, 1.

Ray Harroun, a Marmon Pilot

Bob Burman, Driver of Buick

ond in the Indiana trophy and third in the Cobe cup. Chevrolet has three wins to his credit, but the black marks against him are the four times he ran unplaced. It seems to be a case of win or not finish with the burly Swiss.

Hanshue a Recent Find

Out on the Pacific coast they have produced a driver who promises to be very much in evidence from now on—big Harris Hanshue, who was unknown in the east until he served as mechanic for Seymour in the Cobe cup race. Then he went back home and electrified the motoring world by winning the Ferris cup road race in an Apperson at the rate of 64.45 miles an hour. At that time that was the stock car record for America, and was eclipsed only by the American grand prix at Savannah, won by Wagner in a big Fiat. Hanshue achieved another victory when he won the big car class at Portola recently and ran second to Fleming in the free-for-all at the same meet. He also was runner-up in the Mount Baldy hill race and was a participant in the recent Los Angeles-Phoenix desert road race, in which he finished fourth.

Bob Burman has devoted more of his time to track work than he has to road racing, and because of this his record on the highways is not as brilliant as that of his team mate, Chevrolet. However, he has a record of one first and a second out of five starts and his work always has been high class. Harry Grant, the Vanderbilt hero, has only one credit mark, but then he has driven in only two road races this year. The other time he came so close to winning that Robertson trembles even now when he thinks how near he was to being beaten in the national stock chassis race at Lowell.

On the smaller cars such pilots as Joe Matson, Billy Knipper and Ray Harroun have shown they are among the top-notchers. Matson twice has come into the limelight and both times in big events. Knipper has earned brackets only once, but in addition to that he came so close to winning the Vanderbilt that it would seem he is entitled to some credit for his work in that classic. Leading for nineteen laps out of twenty-two is a performance that makes Knipper worthy of a place in the hall of fame.

Each of these drivers has his own way of piloting a racing machine. Dingley is a really skilful pilot, experienced and always cool. He served his novitiate with Herb Lytle in the early days of the Vanderbilt and was Lytle's mechanic in the last Gordon Bennett that was run in Europe. This taught him a lot and after a couple of years' retirement he now is very much in evidence. He is essentially a fast driver, but withal cool and collected at all times. He has a reputation for always bringing his car through, and if he could have driven in the Vanderbilt he might have added to his laurels.

Robertson is a brilliant driver and an expert pilot. Robertson is not credited with possessing the mechanical knowledge of Dingley, Chevrolet or Burman, but put him in a good car which does not give him any mechanical trouble and Robertson will get out all the speed the machine possesses. He is essentially a front-runner and drives best when setting the pace himself. He is fast on the turns and not afraid to take a chance. But it is claimed that he is not the fighter that Chevrolet is, although his record of wins is fully as brilliant as that of the daring Swiss who has done so well this year.

Chevrolet a Fighter

Chevrolet is much like Robertson in driving ability, but he has the added advantage of being a fighter—a man who never knows when he is licked. This was shown in the Cobe cup race, which he won under discouragements that would have caused almost anyone else to quit. In the tenth lap of a seventeen-lap race a valve broke and punched a hole in a piston, which put one cylinder out of commission. Yet the big Swiss limped along on three cylinders for the remaining seven laps and had enough leeway to beat Bourque in the Knox by a minute for one of the biggest trophies of the year. Chevrolet's game, there's no denying it, and it is this characteristic, combined with his mechanical knowledge that has made him the great driver he is. He always starts out at neck-break speed and generally it is Chevrolet who leads in the early stages. If his car will hold up he wins, and if it doesn't he figures among the also-rans.

Characteristics of Grant

Grant is different from the general run of drivers. He is a slow beginner and in the two races he drove this year he came from behind. He seldom beats it—it is a steady plug most of the way with his last lap his fastest. This is the way he drove at Lowell. In the early stages he never was noticed, but near the end he assumed the lead and looked the winner until hard luck overtook him. It was about the same way in the Vanderbilt. He was back in the ruck most of the way and was given little recognition until Knipper fell by the wayside. Then he was going better than 70 miles an hour, and his last lap was better than 72.

Matson, Knipper and Harroun are cast from the same mold apparently. Each is cool and nervy—nothing grandstandy about them—and they manage their cars well and never are worried. All three of them are just as good on the track as they are on the road, and their reputations in both departments have been greatly enhanced as a result of the 1909 campaign.

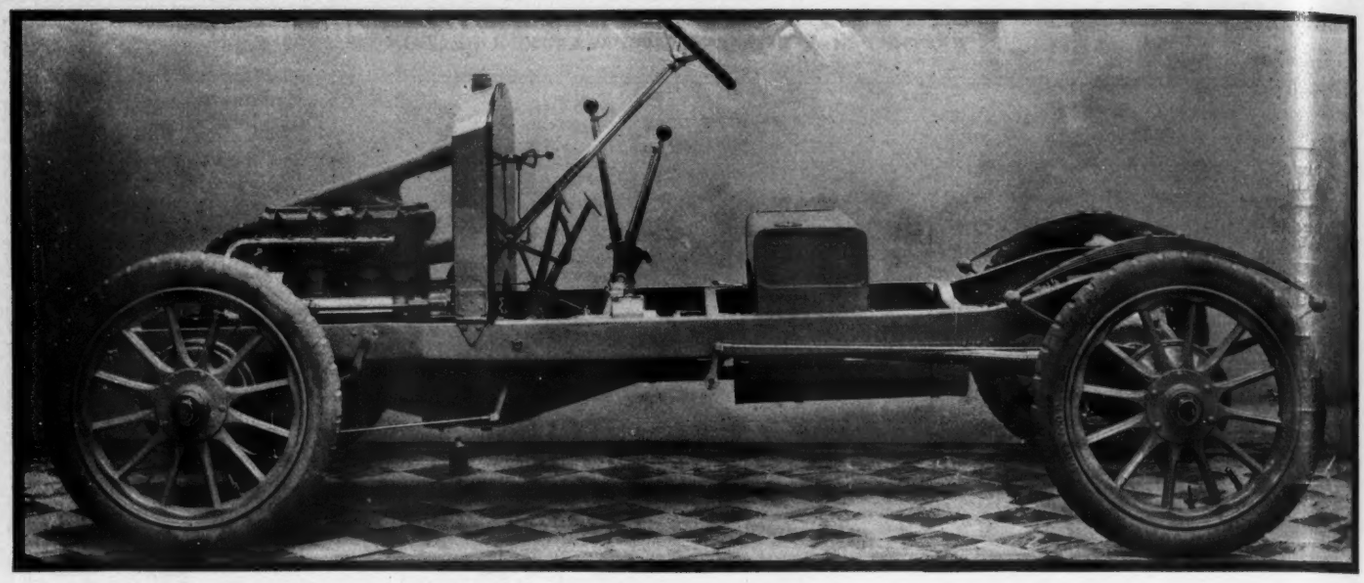
Al Poole, well known in racing circles, started only twice. He drove in the Indiana trophy race and did not finish, while in the big race at Lowell he was a good second. The disappointment of the year on the road was Strang, who started six times and never was in the money, finishing in only two races.

ROAD RACES RUN IN EUROPE DURING SEASON OF 1909—ALL SMALL-CAR EVENTS

Race	Date	Car	H. P.	Driver	NO. STARTERS	Distance	Time	AV. M. P. H.
Sicily Targa Florio	May 1	S. P. A.	43	Ciuppo	11	93	2:43:19	34.2
	Second	Fiat	42	Floris			2:44:19	33.9
	Third	Lancia	20	Airoldi			2:55:25	31.8
Sicily Voiturette Cup	April 29	Lion-Peugeot, 1 Cyl.		Goux	6	187.5	6:48:02	27.5
	Second	Lion-Peugeot		Guippone			6:52:30	
	Third	De Dion-Bouton		Olsen			7:47:55	
Barcelona, Spain Catalagna Cup	May 20	Lion-Peugeot, 2 Cyl.		Goux	11	226.4	6:18:06	36
	Second	Sizaire-Naudin, 1 Cyl.		Sizaire			7:37:46	29.68
	Third	Werner		Soyez			7:38:43	29.61
Ostende, Belgium Ostende Voiturette Race	Sept. 14	Lion-Peugeot, 1 Cyl.		Guippone	11	249.6	4:33:28	54.7
	Second	Le Gui		Thomas			4:39:26	53.06
Ostende, Belgium Ostende Cup	Sept. 13	Imperia	25	Sabbe	2	249.6		
	Second	Miesse		Shotten				
Ostende, Belgium De Liede kerke Trophy	Sept. 12	Vivinus	25	Christiaens	3	249.6	4:54:38	50.8
	Second	Vivinus	25	Fisher			4:54:57	50.9
Boulogne, France Voiturette Race	June 20	Lion-Peugeot, 1 Cyl.		Guippone	15	282.6	5:65:29	47.5
	Second	Lion-Peugeot, 1 Cyl.		Goux			6:02:05	46.9
	Third	Le Gui		Thomas			6:14:13	45.22
Paris, France Normandie Cup	Aug. 29	Lion-Peugeot, 1 Cyl.		Boillot	8	208.8	3:11:27	65.4

AMERICA'S RECORD IN A ROAD-RACING WAY FOR SEASON OF 1909

Race	Date	Car	H. P.	Driver	NO. STARTERS	Distance	Time	AV. M. P. H.
Garden City, L. I. Vanderbilt Cup	Oct. 30	Alco six	60	H. F. Grant	15	278.08	4:25:42	62.8
	Second	Fiat	48	E. H. Parker			4:30:58⅘	61.5
Garden City, L. I. Wheatley Hills Cup	Oct. 30	Marmon	30	R. W. Harroun	4	189.6	3:10:21⅘	59.7
Garden City, L. I. Massapequa Cup	Oct. 30	Chalmers-Detroit	30	J. Matson	6	126.4	2:09:52⅘	58.5
	Second	Maxwell	22	M. Doorley			2:28:28	51.07
	Third	Maxwell	22	A. See			2:30:24	50.42
Lowell, Mass. Lowell Trophy	Sept. 8	Simplex	53	G. Robertson	20	318	5:52:01⅘	54.2
	Second	Isotta	53	A. Poole			6:13:37⅘	51.6
	Third	Fiat	48	Parker			6:22:21⅘	49.9
Lowell, Mass. Vesper Club Trophy	Sept. 6	Buick	30	R. Burman	8	212	3:49:08	55.5
	Second	Benz	36	Stoecker			4:02:55	52.42
	Third	Chalmers-Detroit	30	B. Dingley			4:04:19	52.06
Lowell, Mass. Yorick Club Trophy	Sept. 6	Buick	30	L. Chevrolet	6	150	2:56:17	51
	Second	Buick	30	R. Harroun			3:15:51	45.95
Lowell, Mass. Merrimack Valley Trophy	Sept. 6	Chalmers-Detroit	30	W. Knipper	9	127.2	2:28:43	51.3
	Second	Maxwell	24	A. See			2:40:11	47.55
	Third	Maxwell	24	T. Costello			2:44:01	46.4
Los Angeles, Cal. Mount Baldy Race	Sept. 10	Pope-Hartford	29.7	W. Reuss	3	93	3:00:04	30.99
	Second	Apperson	53	H. Hanshue				
Crown Point, Ind. Cobe Cup	June 19	Buick	32.4	L. Chevrolet	12	395.6	8:01:39	49.9
	Second	Knox	40	W. A. Bourque			8:02:44	49.1
	Third	Locomobile	40	G. Robertson			8:14:30	48
Crown Point, Ind. Indiana Trophy	June 18	Chalmers Detroit	25.6	J. Matson	16	232.7	4:31:21	51.4
	Second	Locomobile	32.4	G. Robertson			4:39:03	50
	Third	Marion	28.9	A. Monsen			4:42:03	49.5
Philadelphia, Pa. Fairmount Park Cup	Oct. 9	Simplex	53	G. Robertson	21	200	3:38:58⅕	55.4
	Second	Chalmers-Detroit	40	B. Dingley			3:44:20	54.2
	Third	Apperson	53	H. Harding			3:52:17	52.2
Riverhead, L. I. Class 1	Sept. 29	Fiat	45	R. DePalma	5	227.5	3:38:35⅘	62.4
Riverhead, L. I. Class 2	Sept. 29	Palmer & Singer	60	E. Lescault	2	182	2:59:04	60.9
Riverhead, L. I. Class 3	Sept. 29	Sharp-Arrow	40	W. Sharp	1	136.5	2:09:02	63.6
Riverhead, L. I. Class 4	Sept. 29	Buick	30	L. Chevrolet	3	113.75	1:37:36	69.6
	Second	Buick	30	R. Burman			1:46:02	64.36
Riverhead, L. I. Class 5	Sept. 29	Maxwell	22	A. See	5	91	1:41:22	53.8
	Second	Maxwell	22	T. Costello			1:44:13	52.38
	Third	Buick	18	J. Finch			2:15:23	40.32
San Francisco, Cal. Portola Race, Class 3	Oct. 23	Pope-Hartford	29.7	J. Fleming	29.7	254.16	3:59:18	63.72
	Second	Apperson	53	H. Hanshue			4:07:54	61.51
	Third	Lozier	45	H. Michener			4:29:57	56.49
San Francisco, Cal. Portola Race, Class 2	Oct. 23	Apperson	53	H. Hanshue		211.08	3:22:56	62.4
	Second	Lozier	45	H. Michener			3:43:59	56.54
San Francisco, Cal. Portola Race, Class 1	Oct. 23	Pope-Hartford	29.7	J. Fleming		148.26	2:15:23	65.7
	Second	Autocar	24	W. C. Morris			2:49:20	52.53
Los Angeles, Cal. Ferris Cup	July 10	Apperson	53	H. Hanshue	15	202	3:08:03	64.45
	Second	Chadwick six	60	B. Siebel			3:15:30	61.1
	Third	Stearns		F. Free			3:19:52	60.7
Los Angeles, Cal. Shettler Cup	July 10	Chalmers-Detroit	30	B. Dingley	8	202	3:38:35	55.2
	Second	Stoddard-Dayton	24	Siefert			3:42:45	54.39
	Third	Buick	30	Nikrent			3:49:30	52.8
Santa Rosa, Cal.	May 9	Stoddard-Dayton	44.1	B. Noonan	12	50	1:05:18	45.9
	Second	Stevens Duryea six	40	C. Onthank			1:07:30	44.4
	Third	Stoddard-Dayton	44.1	F. Wiseman			1:10:23	42.8
Portland, Ore. Wemme Cup	June 12	Chalmers-Detroit	40	B. Dingley	16	102.2	1:44:18	58.79
	Second	Stoddard-Dayton	44.1	Christofferson			1:44:31	58.76
	Third	Locomobile	40	M. Page			1:51:05	55.2
Portland, Ore. Class B	June 12	Cadillac	30	H. M. Covey		43.8	47:0[illegible]	55.7
	Second	Chalmers-Detroit	30	B. Dingley			50:2[illegible]	52.2
	Third	Auburn		Cohen			69:00	38.8
Portland, Ore. Class C	June 12	Pope-Hartford	29.7	C. Arnold		43.8	45:53	57.2
	Second	Chalmers-Detroit	40	B. Dingley			47:27	55.3
	Third	Stoddard-Dayton	24	Christofferson			47:34	55.2
Denver, Colo. Brighton Cup	July 5	Colburn	40	E. McMillan	6	290	7:26:24	33.1
	Second	Moon	30	H. Brinker			7:29:02	32.9
	Third	Chalmers-Detroit	30	Matson-Knipper			7:38:48	32.2
Los Angeles-Phoenix Desert Race	Nov. 6-8	Buick	30	J. and L. Nikrent	9	480	19:13:00	24.8
	Second	Columbia	32	H. Stone			23:35:20	20.3
	Third	E—M—F	30	Latham, LaCross, Lord			23:36:06	20.2



CHASSIS OF THE 15-HORSEPOWER ARROL-JOHNSTON WHICH IS EXHIBITED AT THE OLYMPIA SHOW

Europe's One Big 1910

Olympia, Contrary to Expectations, Fails to Produce Any Great Reduction in Prices—Improvements in Body Design

LONDON, Nov. 12—The Olympia show formally opened today and shows beyond anything else that the energies of the motor manufacturers during the season now ending have been almost entirely directed to detail improvement and simplification. The past year has been singularly free from the freaks of design which a year or so ago were so common. Motor car design consequently has settled down into a groove that has permitted the manufacturers to reduce the all-round cost of production to such an extent that in many cases dividends are being paid on shares that for some seasons scarcely have been worth the paper they are written on.

Contrary to the expectations of those who are not in the know there will not be, for 1910, any great reductions in the prices of cars, which generally speaking are marked up at precisely the same figure, if not a higher one, as last year. There are, however, one or two remarkable instances of price reduction which will be fully dealt with next week. The show, therefore, exhibits a year's development of degree rather than a development of principle. The result is that the comfort of the motorist has been carefully studied.

General Design in Car Building

Motor body builders, most of whom started as builders of horsed carriages, have at last begun to realize that the same principles of construction do not with equal truth apply to both vehicles. The result is that 1909 has seen almost the last of a horse-vehicle body thrown on to a motor chassis and a really distinctive and beautiful type of motor car is being gradually evolved. No one year ever has witnessed such a tremendous step forward in this direction and with one bound the motor car has jumped from a rather draughty and not always comfortable conveyance to a luxuriously comfortable vehicle—and this, be it noted, with practically no enhancement in price.

The recent revocation of the Renault patents—owing to the fact that they were not being worked—in the British Isles has, no doubt, had some effect in leading several manufacturers to adopt the graceful lines of the premier French make, although for some time it has been clear that designers have been only too anxious to get away from the prevalent shape and style of bonnet.

Gasoline cars appear to have fallen by a process of natural selection into four principal powers and to recapitulate them is to name, in the large majority of cases, the models that most of the principal manufacturers are exhibiting.

Classification of the Types

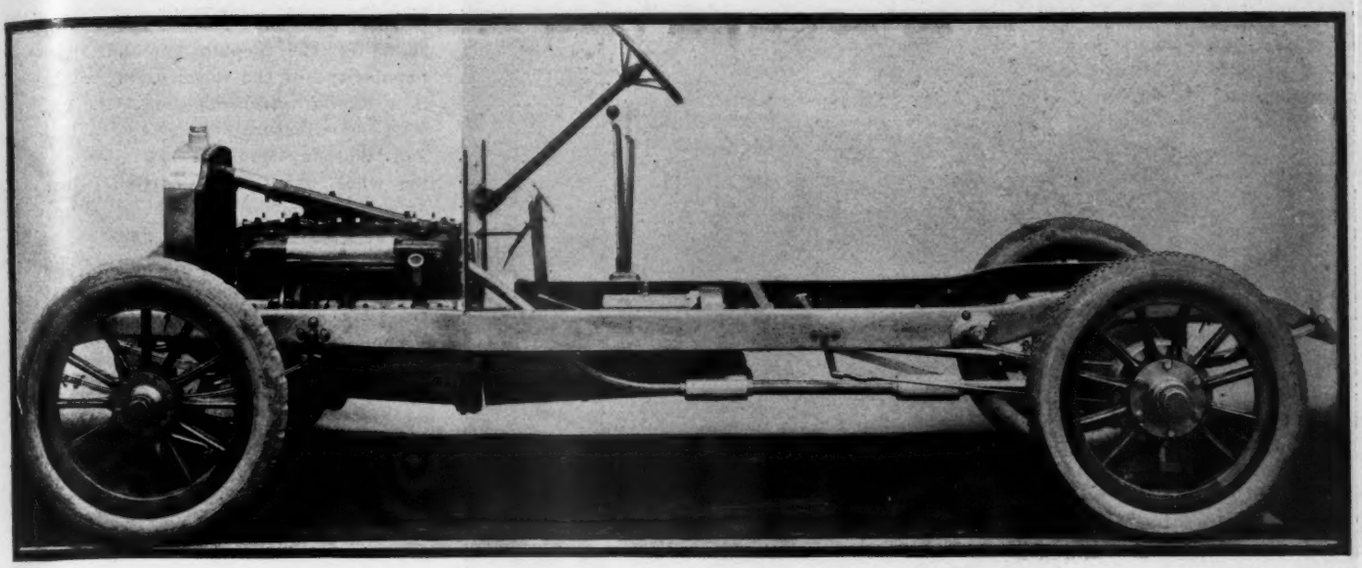
First of all there is the small single-cylinder voiturette of from 6 to 9 horsepower. This, in popularity, is holding its own more than ever. The better design of the engine which has been evident during the past season is likely to bring it enhanced favor. It may be said that in this particular type of car quite a little competitive war is taking place on the English market. The average specification of the English single-cylinder is as follows: Engine, 4 to 5 inches bore and 5 to 8 inches stroke, water-cooled, thermo-syphon system with honeycomb radiator, magneto ignition—sometimes dual ignition is fitted—mechanical valves, automatic carbureter and half-compression cam for easy starting, leather cone clutch, three-speed gear box with plain bearings, live axle drives through bevel, irreversible steering, two sets of brakes, excellent springing and large tires; price, from $700 to $800. So large a hold has a car of this sort on the British public that when the Austin company joined hands with the Swift company in building a car of this type, 600 orders were booked almost before the drawings had passed to the pattern shop. Those combined companies are now erecting a special factory to cope with the orders they have in hand. The speed of such a car may be anything from 30 to 50 miles per hour and many makers fit their modest little chassis with an imposing racing body.

The second type of car is the small four-cylinder from 10 to 18 horsepower and costing anything from $1,000 to $2,200 for the chassis. Back of the engine the specification is practically that of the one-cylinder, but on a larger and more highly-finished scale. In general these cars are run as two-seaters, but a good many carry four, or even five-seated body. They are fast little machines and probably excel in point of number sold of any other model. It is chassis of this type that come in for commercial work in the form of taxicabs and light vans.

Slowly-Disappearing Type

The third type is of a power from 20 to 30 horsepower and has either four or six cylinders, the latter being a largely increasing feature. This is practically the standard touring and town car and its specification needs no description.

The fourth type is one that seems to be slowly disappearing, to judge from the large number of prominent manufacturers who have dropped their large models to go in for smaller cars of the second type. Six cylinders are the rule for the heavy car which runs from 40 to 60 horsepower, some, at least, of the waning popularity of which may fairly be described to the increasing cost of tires.



CHASSIS OF THE 27-HORSEPOWER, SIX-CYLINDER VAUXHALL EXHIBITED AT OLYMPIA

Show Opens in London

Little Change Noted in Motors —Simplicity, Accessibility and Silence Aim of Designers of the English-Made Machines

As already laid down few changes have taken place in the motors themselves, the principal points which have received attention at the hands of designers being simplicity, accessibility and silence. To attain a greater degree of the first, it is now usual—in the smaller powers it is almost universal—to employ the en bloc system of casting. When this is done the inlet manifold, and frequently the exhaust distribution pipe also, is cast integral with the cylinders, which are surrounded by a single large common waterjacket closed by a plate at the top which carries the water outlet pipe. Thermo-syphon cooling is nearly always used and fans behind the radiators are rapidly disappearing owing to the high efficiency of the modern honeycomb. This arrangement of en bloc casting, which also is used by several makers in quite large-powered engines has the great advantage of reducing external piping to a minimum and thus giving very greatly increased accessibility to the engine. The carbureter, for instance, which used to be hidden beneath a network of pipes is now quite lonely and is frequently placed in the plain side of the motor, all the valves of which are, in nearly every case, on one side of the engine, the inlet pipe passing through the waterjacket between the pairs of cylinders and branching off into its manifold on the further side of the valves. In some cases this integral casting has been rather overdone and efficiency has been sacrificed to a simplified appearance.

The valves being all on one side enables a single camshaft to be used and also permits the valve-stems, tappets, springs, etc., to be enclosed in a box cast in into the cylinders and having a removable inspection lid. In this way the valve stems, etc., are well lubricated without a dirty engine resulting and the noise of the tappet valve is reduced to an almost inaudible minimum.

For large engines the cylinders are as a rule cast in pairs with an integral exhaust and inlet manifold to each pair of cylinders.

A feature which has gained such popularity as to be found on most of the motors in the show, is the arrangement of the magneto and water pump, where such is fitted, on a skew-driver cross-shaft placed at the forward end of the motor. By this means the contact-breaker and distributer of the engine are rendered very readily accessible, while when a pump is fitted, this is also handily placed for a convenient arrangement of the inlet water pipes.

The effect of the Silent Knight engine which has achieved a success which even its designer could scarcely hope for in his most sanguine moments, has of course produced a crop of imitators, and the result is the introduction of several types of rotary piston and sleeve valves.

Some Ignition Features

High-tension magneto is absolutely universal and dual high-tension ignition is rather less in evidence than one would suspect. This fall in popularity has been to a great extent due to the inadequate starting-up coils supplied with the dual systems, but the magneto itself has been so improved that no starting difficulties are experienced when that ignition alone is fitted.

So with the cars themselves so with the magneto improvement which has been made along lines of modification not along those of elaboration and these devices have been made practically foolproof. When dual ignition is used, this is principally of the two—separate—system type using a double set of plugs. Only the very cheapest single-cylinder cars have the coil and accumulator system alone and low-tension magnetos are conspicuous by their almost entire absence.

An arrangement of the magneto which is worthy of note on account of the increased favor it is finding is that in which the machine is driven by a shaft passing over the heads of the cylinders, the magneto itself being fixed to the driver's side of the dashboard when it is very accessible and can be inspected when the car is running.

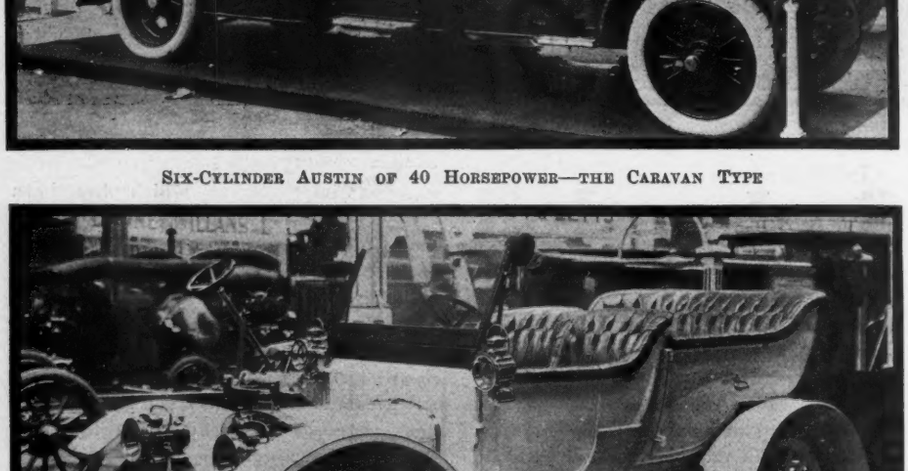
Other Engine Details

With regard to other engine details the principle of laying down the engine, gearbox, brake, etc., in one unit which was so prominent a feature at last year's Olympia show has almost entirely dropped out for no apparent reason at all. Ball bearings for the motor, too, have given way to plain white metal-lined journals.

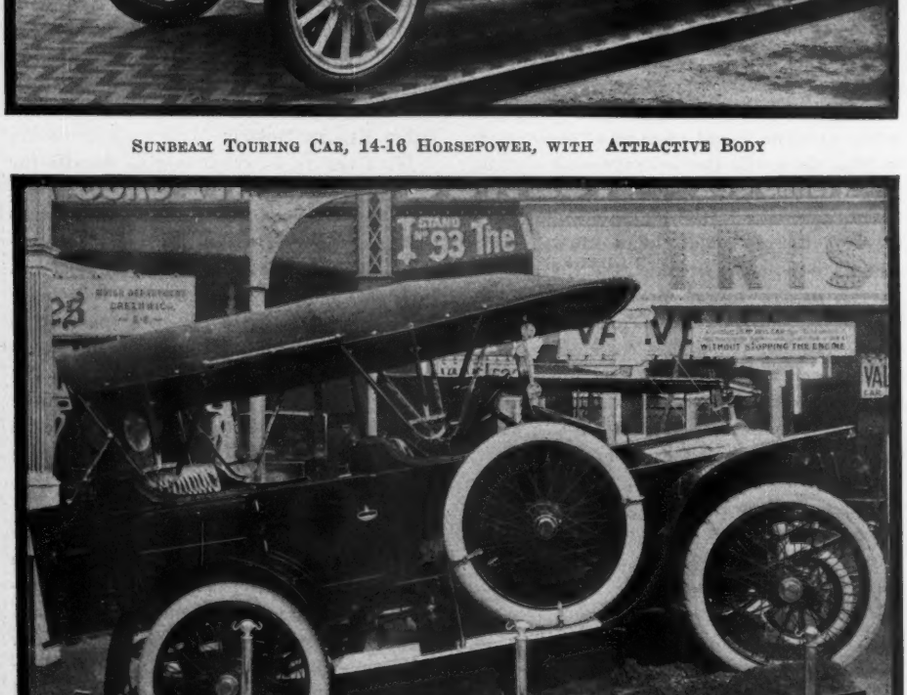
The fight for popularity between the leather cone and the metal disk clutch seems to be in exactly the same state as it was last year and it is now generally accepted by the British manufacturer that a good leather clutch is just as good as a good metal one. The multiple disk type has given way more than a little to the single-plate form. The principal improvement in the clutch line appears to be that nearly all are now externally adjustable.

Ball-bearing gearboxes are now universal except in the case of the small cheap voiturettes which have long plain bearings. The gearshafts have been brought to their maximum of shortness and three speeds are, thanks to a more flexible engine, more common than four. In the latter case the fourth gear is nearly always indirect.

SIX-CYLINDER AUSTIN OF 40 HORSEPOWER—THE CARAVAN TYPE



SUNBEAM TOURING CAR, 14-16 HORSEPOWER, WITH ATTRACTIVE BODY



NAPIER OF 15 HORSEPOWER WHICH IS DESIGNED FOR COLONIAL USE

One of the most notable features of the show is the popularity—and deserved popularity—of the worm drive which now is a standard transmission in the cars of such manufacturers as Napier, Daimler and Wolseley-Siddeley. The worm driving wheel generally is carried below the driven differential crown wheel on account of the greater ease of lubrication, which this position permits, but there is the disadvantage that the ground clearance is curtailed by this practice. Accordingly a choice of positions, above or below, is sometimes offered.

Live axles are now so made that the whole of the differential gear is accessible by the removal of a large plate or cap at the rear of the differential box. This being the case makers in general arrange the drivingshafts so that they can easily be drawn out of their axlecases and the whole differential thus bodily removed through the inspection plate. Ball bearings throughout the transmission are the proper thing.

Development in Brakes

Considerable development in the design of braking systems is evident in the British car for 1910. The front-wheel brake has found several adherents and one or two prominent makers are now fitting it as standard. Apart from this designers show more than a tendency to mount both foot and hand brakes on the driving wheels, not as before placing the foot brake in the rear of the gearbox. This is an excellent system in every way and it is not unlikely that next year's show will find it universal.

Increased comfort to the motorist being the keynote of the exhibition it is natural that the suspension of the car should have received considerable attention. Three-quarter elliptic springs are now almost standard for the rear wheels—some makers go further still and fit the full-elliptics, while several cars, notably Daimlers, are provided with first-intention coil springs to take up minor road shocks, leaving the leaf-springs to absorb the larger ones. Shock-absorbers of the frictional type have almost completely disappeared and not a single maker has standardized them.

Tires and Wheels

From the number of tire and wheel exhibits, it is clear that tire manufacturers pin their faith to the all-rubber non-skid of which several ingenious designs are shown. In consequence the heavily-armored road-destroying anti-skid tire is less in evidence, a fact which calls for little wonder. The reinforced inner tube is generally regarded as one of the greatest steps forward in modern pneumatic tire progress and this together with a detachable wheel system is likely to render the motorist of 1910 almost entirely free from tire worries.

Wire wheels of the detachable type, of which there are now several varieties, all excellent from the point of view of celerity in replacement, are coming strongly into

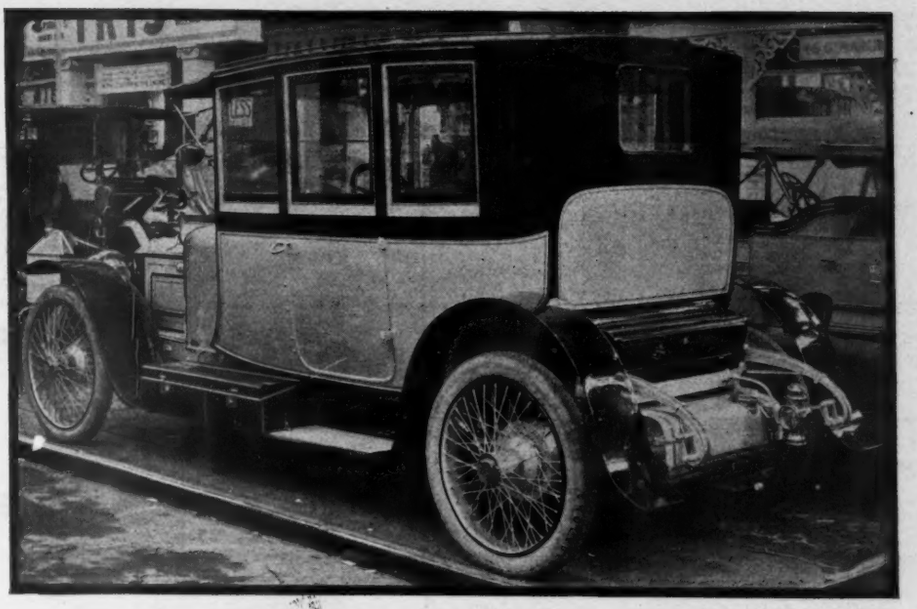
favor, while the wooden artillery wheel also has a big competitor in the all-steel wheel, which, while no heavier, is far and away stronger.

Accessories are many and ingenious, far too great in number to describe within limited space, except to say that they all spell increased motoring comfort. The lens mirror type of headlamp is fast gaining in popularity over that fitted with a condensing front lens. Acetylene generators are principally of the mechanical automatic-separator type and are in practically every case made separate from the lamp iself. Electric illumination is also very prominent in conjunction with a generator and storage battery sytem. Horns are yielding to exhaust sirens and electric buzzers.

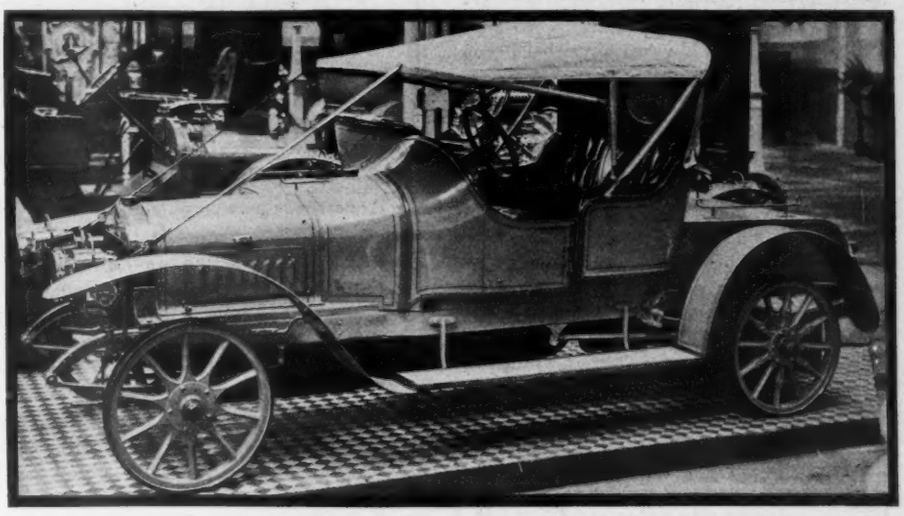
Features of the Show

No such furore attended the opening of the show this year as the Knight-Daimler motor of a year ago created. This motor, the invention of Charles Y. Knight, a Chicagoan, operates on the sliding sleeves principle, the sleeves uncovering intake and exhaust ports in the cylinder walls, thereby dispensing with poppet valves. For next season the Daimler company has no fewer than five different models fitted with this type of engine. The three four-cylinder models are rated at 15, 22 and 38 horsepower, and the two six-cylinder types at 33 and 57 horsepower. Although somewhat contrary to English manufacture the company has, owing to the flexibility of the motor, dispensed with the four-speed gearset so that now three forward changes only are fitted. The company uses, however, on all except the smallest models, a three-jet carbureter, a double-jet one being used on the small car. Wire wheels are fitted on all models and an innovation is the use of supplementary spiral springs in connection with the semi-elliptic rears.

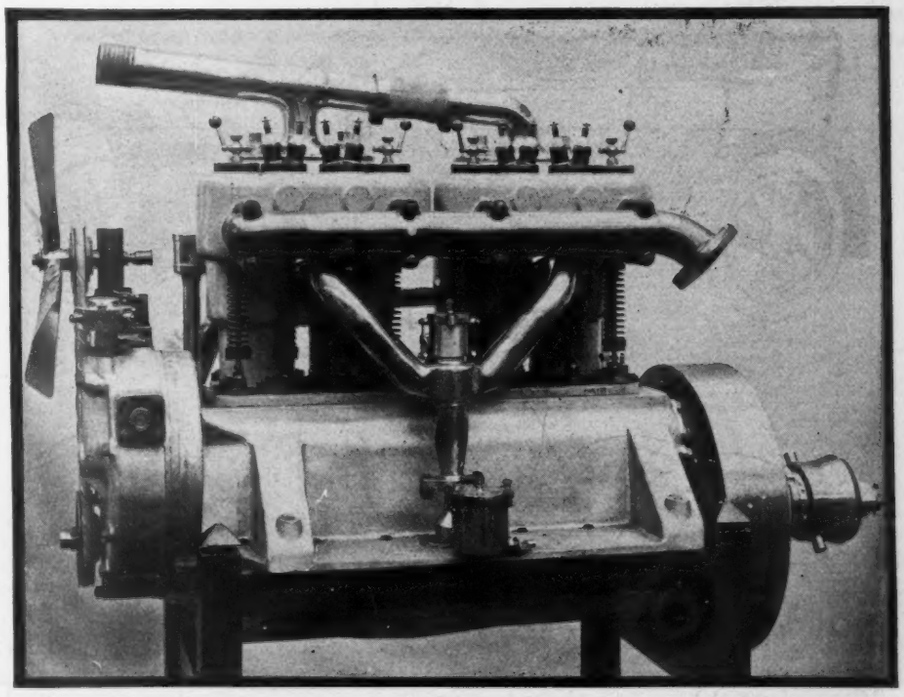
The revocation of the Renault patents on the closed bonnet system in conjunction with the radiator back of the motor has given free scope for manufacturers imitating this classy type of French car, one of the first being the Arrol-Johnston Co., which has brought out a 15.9-horsepower chassis which to all intents and purposes could be taken for a Renault. This car carries not a few interesting features, among which must be noted the unit construction of the motor and gearbox, both of which are carried on a large aluminum bed plate, a system not unlike that used on the Mora cars in America. The crankcase proper bolts to the planed surface of the aluminum bed plate and when the motor is lifted the crankshaft is raised with it, which design also applies to the gearbox. Like the Renault, thermo-syphon circulation is used and the radiator which takes the place of a dash is a vertical-tube type with 6 gallons' capacity. The flywheel located directly beneath the radiator serves as a fan. In connection with the side members of the frame it is worthy of note that as they approach the rear axle



TWENTY-SIX-HORSEPOWER SPORTING LIMOUSINE METALLURGIQUE



DELAGE 10-HORSEPOWER, FOUR-CYLINDER VOITURETTE



STURDY-LOOKING MOTOR USED BY THE ARGYLL MANUFACTURERS

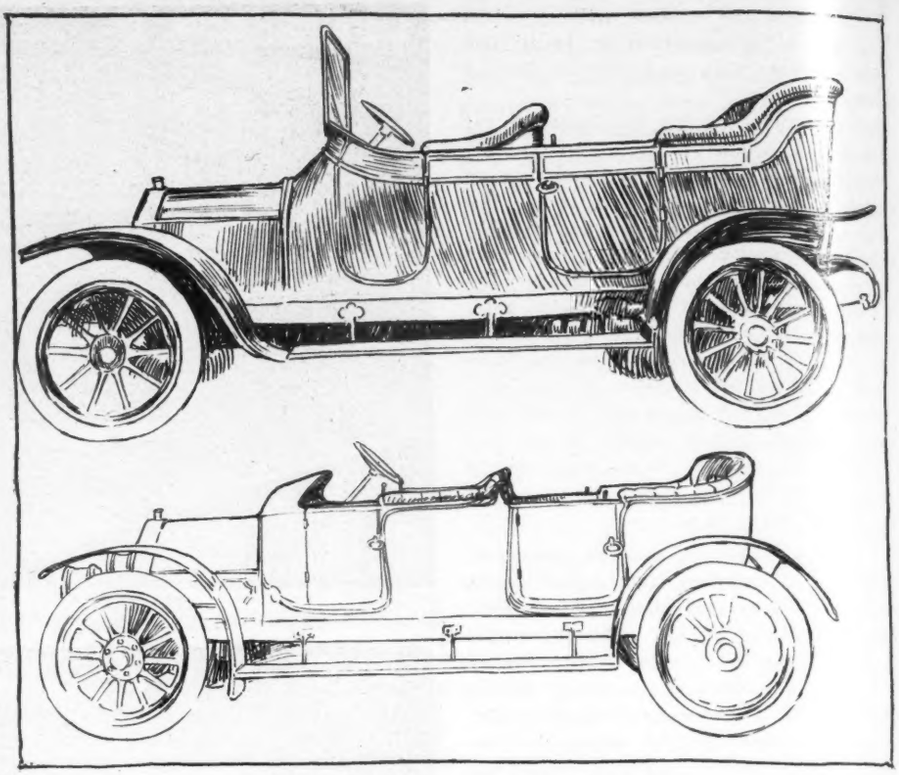
they curve upward to give axle clearance and then curve horizontally inward until they meet at a point where they are gusseted and riveted together.

Six Argyll Models Shown

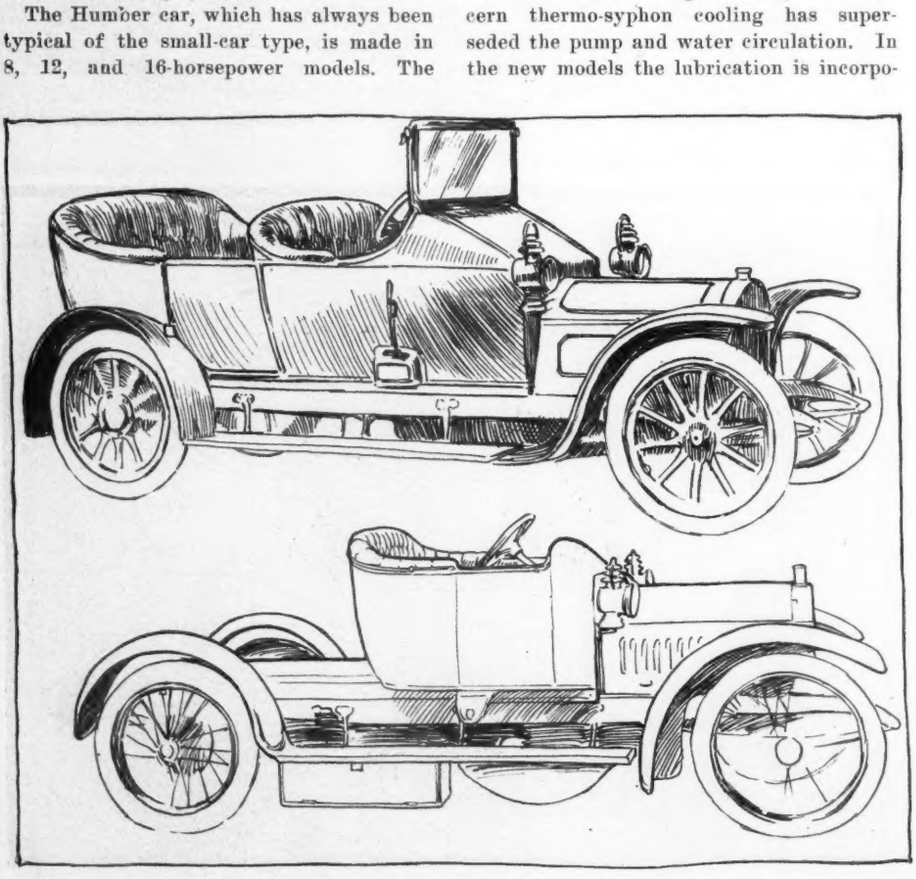
Argyll cars, which have taken a prominent place in motoring in Great Britain and the colonies for the last few years, are shown in not fewer than six models, four of which are new ones for the coming season. All are of the four-cylinder type with cylinders in pairs. The new cars are examples of up-to-date construction in every respect, the motors employing but one camshaft and having cylinders cast in pairs and cooled by thermo-syphon circulation. The gearbox located amidship is a one-piece aluminum casting, the shafts in a vertical plane with a layshaft in the bottom of the case carried on ball bearings and the mainshaft on top carried on plain bushings. The motor uses a transverse shaft in front for driving the magneto. Three-quarter elliptic springs are employed.

Lancaster cars always have been conspicuous for their individuality of design and for next season they are no exception to this rule. A feature in them is the ball-bearing steering knuckle with special provisions added for making them dust and oilproof. In this car the conventional bonnet is not used, the multi-cylinder motor being located longitudinally between the driver and the other front-seat passenger. This results in rather a unique type of vehicle but one possessing particularly easy riding qualities.

The Humber car, which has always been typical of the small-car type, is made in 8, 12, and 16-horsepower models. The 8-horsepower is a two-cylinder model, fitted with three-speed gearset with a 4.61 to 1 gear ratio on direct drive. Like all small cars it is fitted with a high-tension magneto, mechanical lubrication, and all of the other attributes of higher-type machines. In the new models brought out by this concern thermo-syphon cooling has superseded the pump and water circulation. In the new models the lubrication is incorporated in the crankcase, there being a gear pump located in the base of the crank-chamber with the usual circulation and re-circulation of oil to the motor parts and the filtering of it between each circuit. The company is in accord with the present tendency of constructing particularly short gearboxes and mounting both shafts of the set on ball bearings. On these cars a four-speed gearset is used, with direct on the fourth at a ratio 3.57 to 1. The third-speed ration is 5.13 to 1, the second 8.19 to 1, and low-speed 12.8 to 1. The bodies of these cars are fitted with high doors to the front seats, and detachable wheels are regular.



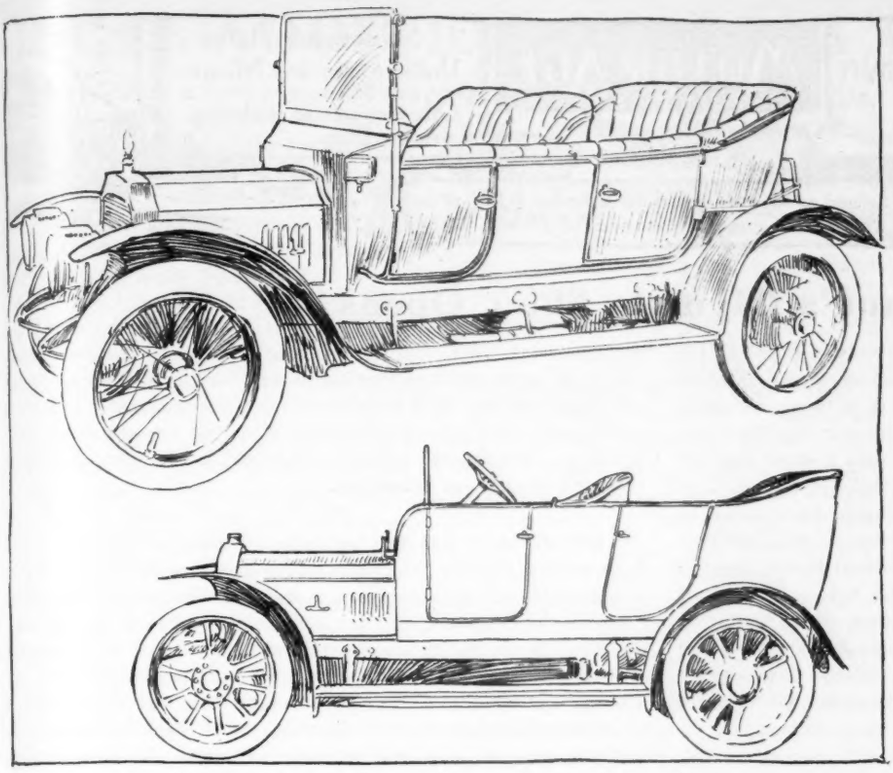
COLE TYPE OF BODY—A VALVELESS BODY TYPE



CANN SIDE-ENCLOSED IDEA AND A NEW RUNABOUT BODY

Specializing On One Model

A policy of manufacture which has not had a great following in this country but one which is on the increase at the present time is that of specializing on one model instead of marketing five or six different sizes. The Straker-Squire 15-horsepower car for next year is an example of this, the chassis being made suitable for four types of bodies, two-seater, four seater, landaulet and runabout. Accessibility has entered in not a few of the improvements in conjunction with the motor which is of the conventional L type with cylinders in pairs, and a transverse shaft at the forward end for driving the magneto. Large inspection plates are located on the sides of the crankcase and the camshaft is readily removable. The company uses thermo-syphon cooling with forced air circulation. The oiling is by a sump system in the crankcase. The oil pump delivers the lubricants to the base in the chamber into which scoops on the ends of the connecting rods dip and furnish the splash system.



TORUNDA BODY ON DENNIS CAR—A STRAKER-SQUIRE TYPE

All brakes are located on the rear wheels and a useful device in connection with these is a metal shield which prevents mud dropping on the bands.

The Wolsley-Siddelley is manufactured in different types, the smaller ones using monobloc four-cylinder castings with intake and exhaust passages incorporated. The cylinders are 3⅛ by 4½, being in conformity with the long-stroke design so popular at the present time. Mixture is fed through the two-jet carbureter in which the smaller jet is used for starting purposes and both for ordinary running. In addition to the double jets a supplementary air valve is used, being controlled by a spring and dashpot with the tension of the spring adjustable from the dash. The cylinders of the L type, but in order to reduce the combustion chamber as much as possible the valve stems are not vertical but set at an angle outward at the bottom, which removes the camshaft further from the crankshaft. This construction suggests that of the Daimler of 3 years ago. In spite of using monobloc castings a three-bearing crankshaft is used, all bearings of the plain type. This car uses thermo-syphon cooling.

Maudsley An Uncommon Type

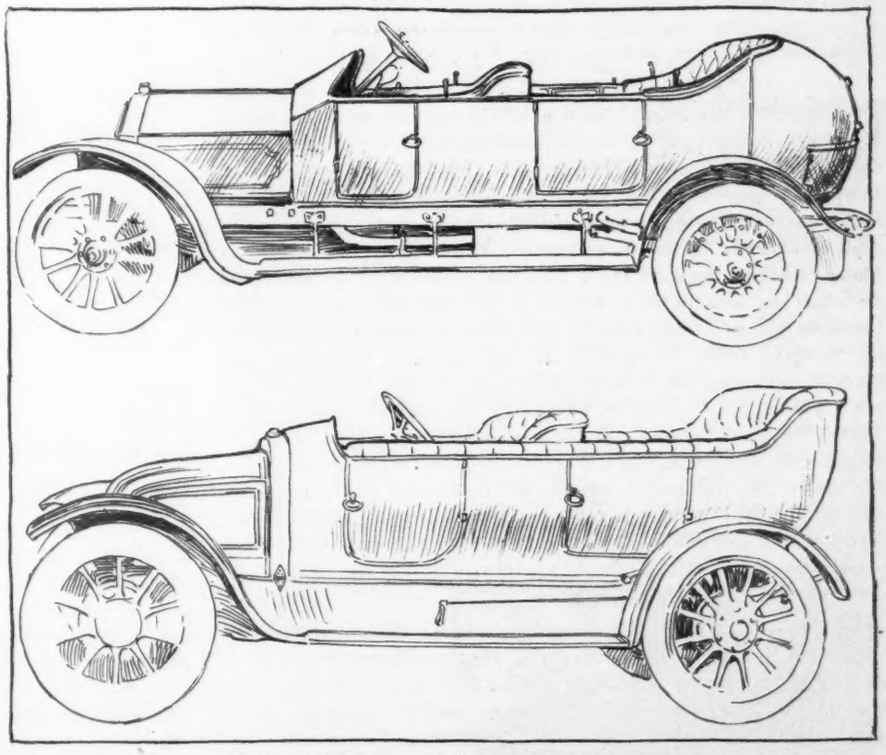
A leading type in the Maudsley is the 17-horsepower car which is one example of the valve-in-the-head type which is so uncommon in England and in addition to being of this type it makes use of the overhead camshaft. Previously this concern has always catered to the high-priced trade, but bringing out this new model with 3⅜-inch bore and 5⅛-inch stroke the company has shown its desire to cater to the great middle class trade. This car is a typical example of the medium-priced product, yet it incorporates the design of the higher-priced machines. It makes use of side members of the frame which are narrowed at the dash and upswept over the rear axle where the three-quarter rear elliptic springs are supported. The front axle is an I-beam forging. The motor is fitted with thermo-syphon cooling system, high-tension magneto with the magneto attached to the dashboard, instead of being mounted on the engine. The rear axle is a neat construction with a spherical chamber for housing the differential and with the brake operating rods all located inside of the frame lines.

The Vauxhall, 20-horsepower chassis, is another good type of the medium-priced car, with cylinders 3½ by 4¾, cast en bloc, and cooled by thermo-syphon system. As with the majority of monobloc motors the valves are located on one side and cover plates are used for valve stems and springs giving the motor a clean appearance. A novelty is that although the valves are on the left side the intake pipes from the carbureter enter the casting at the right side, this being done to insure good heating of the mixture before it reaches the combustion chamber. In the lubricating system of this car a reciprocating plunger oil pump driven off the camshaft forces the oil to the crankshaft bearings and thence through the crankshaft to the lower ends of the connecting rods. The overflow oil from these bearings furnishes the splash system. In conjunction with maintaining the desired oil level in the reservoir in the base of the crankcase a float is used which indicates this level. The transmission gives four forward speeds. All brakes are of the expanding type operating within the rear wheel drums and the expanding shoes have copper facings which work against the malleable drums.

Talbot Has Been Re-Designed

The 12-horsepower Talbot, four-cylinder chassis, has been re-designed so as to lower float and the needle valve. In case the

(Continued on Page 27)



SALMONS' GLIDER BODY—ARROL-JOHNSTON BODY

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England's Olympia Show Opens

ALTHOUGH one of the last to become actively engaged in the motor car industry in its early days, because of the hostility of the county council laws, Great Britain is showing its usual John Bull tenacity by conducting this year the only big European motor car show. Paris a year ago decided that a show was not necessary this year; incidentally the Frenchman also decided that a grand prix race was not necessary. The auspicious opening of the Olympia show, however, has conclusively shown that the motor car is still a big quantity to be reckoned with and that the aeroplane has not entirely usurped the motor field. Because of being practically the only European motor show, the Olympia is somewhat more international in character than last year and the forecast of its various exhibits gives a particularly close line on the trends of construction as they will be evidenced in 1910 models.

IT is a certainty that the low-priced car which has always been popular in Great Britain will be a greater favorite than ever next year. This is borne out by many concerns which heretofore have not given any attention to the 15-horsepower car, whereas for next year several of them have discontinued the bigger models and are devoting all of their attention to the low-priced, low-powered vehicle. In America the low-priced vehicle is almost invariably a four-cylinder car, with a two-speed gearset in the majority of cases, the argument being that with the flexibility of the four-cylinder motor, two forward speed changes are sufficient. The continental maker, as well as the Britisher, view this differently, and it is not uncommon to see a four-speed gearset in a low-horsepower car and a three-speed gearset in single-cylinder cars. The European driver has learned to use the gearset, thereby saving the motor, and has not been so foolishly carried away with the direct-drive idea as have many of the American drivers.

COMFORT has always been a prime favorite with European cars. This had its earliest indication in the bringing out of the limousine in France, followed later by the landaulet during the pioneer periods of which the open car had free rein in America. Besides adhering as persistently as heretofore to the inclosed type of car, the Britisher, in particular, has set about adding to the comforts of the open type. This had been chiefly accomplished by what has become to be known as the high-sided car in which the open spaces at the ends of the front footboards are inclosed by swinging doors, brought up as high as the ends of the seat, thereby achieving what many have been pleased to call the torpedo type of body. Besides, by adding this material comfort, the hooded dash has become popular with many small cars, which in conjunction with bringing the crescent-shaped wind shield nearer the driver has resulted in making the front seat of the open car and particularly of the runabout almost as comfortable as the interior of a landaulet. In many cases this has improved rather than detracted from the general appearance of the car.

THE European builder is more of a student of design than are many of the American makers. This undoubtedly largely is due to the fact that in Europe the designer is not inflicted with the duties of factory superintendent, general overseer of all departments, and other duties which should be looked after by others. Many American factories err in working the designer and engineers too hard, and not leaving them that leisure time in which to study out and thoroughly test new principles of design and construction. It is because of this that frequently the European shows have been more replete with new designs which have not in any wise leaned towards the freakish but have been based on sound mechanical principles.

ONE criticism that can be made of American promoters and with particular reference to the recent speedway meets at Indianapolis and Atlanta is the tendency to exaggerate the importance of the times made in the different contests by labeling anything out of the ordinary as world's records, regardless of whether or not they approach the best marks. Of course this was not done except when some American record was beaten, but then it was taken for granted that American must needs necessarily be world's, whereas such is far from the facts. In making such statements, which of course are duly chronicled throughout the country through the medium of the press, the thunder of others is appropriated. As a matter of fact, there has not been a single record that has been established at either Atlanta or Indianapolis that is the fastest in the world—not even Strang's mile in :37.7. England is entirely overlooked by the promoters in their eagerness to gain publicity for their tracks, for if the Brooklands' record sheet were scanned it would be found there is a great discrepancy between the world's record and the American best. Strang went at the rate of 95.45 miles in his mile trial—a mighty pace, but how slow as compared with the recent mile by Hemery at Brooklands in :31.55, equal to 115 miles per hour! Only in one department—beach racing—has America better time marks than England in the way of motoring speed, so it would be in good taste for American promoters hereafter to look before they leap and remember that there are motor events held in other countries than this and perchance some of them have made better time. Ignorance of the law is no excuse in the courts. Still, America has no reason for feeling ashamed of the performances at Indianapolis and Atlanta, for at both speedways the marks made on the 1-mile horse tracks have been entirely obliterated. At the same time there has sprung up an enthusiasm—a real enthusiasm, not the morbid curiosity that attends a meeting on a horse track, which attracts people who go more with the idea of seeing someone hurt than they do for the sport—for motor racing that in the end is bound to be really beneficial.

IN view of the recent speed attainments of Hemery, who recently smashed six world's records at Brooklands, one must admit that so scientifically is the famous English 2¾-mile oval constructed that it is as fast if not faster than the straightaway beach course at Ormond, Fla. Hemery's ½-mile trial was at the rate of 127.6 miles per hour, or the same pace shown by Frank Marriott in his Stanley steamer at Ormond, and it all along has been supposed that the steamer was faster than any gasoline-propelled car ever built. Therefore, it must be that Brooklands is faster than the beach, for it is a matter of record that the best gasoline mile at Ormond is the equivalent of only 117.64 miles an hour, and that by an eight-cylinder Darracq of 200 horsepower. Hemery's kilometer at Brooklands is better than Marriott's at Ormond, showing 117.761 miles an hour, as against the Floridan :18.2. Only at the mile has Ormond the shade.

URGES ADOPTION OF STOCK CHASSIS IDEA

America Will Ask That Piston Displacement Classifications Be Made International Ones

NEW YORK, Nov. 22—The manufacturers' Contest Association has decided to come out in favor of piston displacement and minimum weight as the basis of regulation for the international speed events for next year. This decision will be submitted at the Paris meeting, December 7, of the International Association of Recognized Automobile Clubs, of which the Automobile Club of America is the sole representative in this country. Following is the announcement made by the Automobile Club of America last night:

"The Automobile Club of America has forwarded to its delegate in Paris, William S. Hogan, the recommendations made by the Manufacturers' Contest Association, representing the consensus of opinion of the American motor car manufacturers, as a basis for international motor competitions for 1910. Although the Automobile Club of America has requested annually the American manufacturers to define their attitude on these matters in order that America might be represented in the international conference, this is the first time in the history of the sport that a definite exposition of the attitude of a majority of the American manufacturers has been put forward. The adoption of a classification by piston displacement and minimum weight with a stock car limitation, is the result of the past experience of the American manufacturers, and especially of the past year of racing and contests in America, when it was well tried out. It is a logical and advantageous classification for motor car competition, both from the standpoint of the manufacturer and the intending purchaser, and is recommended for international adoption. The recommendations are:

First—That only bona fide stock cars or stock chassis be eligible for entry in international events.

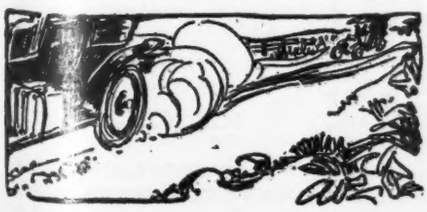
Second—That cars entered in international events be classified as follows:

Open to any chassis which is in accordance with the definition of a stock chassis and in accordance with the following table of piston displacement and minimum chassis weights:

Division	Piston dis. in cubic inches	Min. wht. in pounds
1	160 and under	1,200
2	161 to 230	1,500
3	231 to 300	1,800
4	301 to 450	2,100
5	451 to 600	2,400
6	601 and over	2,600

No car shall compete in any class above that to which its weight entitles it.

"This recommendation is along the lines which will govern competition in America for the coming year, with the possible exception of the larger classes. As the American manufacturers will no doubt build stock cars up to the limit of each of these piston displacement classes, should a similar classification be adopted internationally it would enable foreign and American cars to compete on even terms and should serve to stimulate international competitions, both in America and Europe."



WAHLGREEN RUN POSTPONED

Denver, Colo., Nov. 20—The flag-to-flag endurance and reliability contest from Denver to the City of Mexico for the Wahlgreen trophy will be held the coming year instead of in November of this year as was planned originally. Advices from Mexico received by the management are to the effect that the contest should end in Mexico in the summer of 1910, during the centennial celebration, when it will attract great attention and be of the most possible benefit to the manufacturers, the dealers and the general public. The government of Mexico intends to spend several hundred thousand dollars during the centennial celebration for a varied sporting program, including motor events. At that time the city will be filled with tourists from all parts of the republic as well as from other countries. The dealers of Mexico also recommend that the show in the City of Mexico in connection with the flag-to-flag contest be held during the centennial celebration.

APPERSON WINS LONG RACE

Los Angeles, Cal., Nov. 21—The Franklin entry in the 150-mile race at Ascot Park today plunged through the fence at the first turn and the driver, Guy Irwin, was, perhaps, fatally injured. R. McIntyre, mechanic, was only slightly hurt. The Apperson won in 3:45:00.

Coming Motor Events

DECEMBER

25-Jan. 1—Show at Columbus, O.
28-29—Philadelphia mid-winter reliability run.
31—Opening of Grand Central palace show, New York.

JANUARY

7—Closing of Grand Central palace show, New York.
8-15—Madison Square garden show, New York.
17-24—Philadelphia show.
24-29—Show at Portland, Ore.
24-29—Ninth Annual Detroit Show.
25-31—Detroit show.

FEBRUARY.

4-6—Mardi Gras Track meet, New Orleans.
5-12—N. A. A. M. show, Chicago Coliseum.
14-21—Show at St. Louis, Mo.
14-18—Annual show at Buffalo.
19-26—Show at Newark, N. J.
19-26—Inter-mountain show, Salt Lake City, Utah.
21-26—Annual Cincinnati show.
22-27—Milwaukee Show.
28 to March 5—Show at Kansas City.

MARCH

5-12—Boston show.
21-28—Denver Motor Club show.

NEW ORLEANS, LA., Nov. 21—The good roads track meet which was run at the fair grounds Saturday and Sunday under the auspices of the New Orleans Automobile Club had a small entry list, the honors being divided between Aitken's National and Harroun's Marmon. Aitken experienced considerable trouble negotiating the turns, because he was geared too high for the mile track, having come here from Atlanta. Oldfield drove several exhibitions. Summaries:

SATURDAY.

Five miles, Louisiana championship—Walker, Buick, won; Murphy, Ford, second; others never completed race. Time, 6:48 3-5.

Ten-mile handicap—Basle, Renault, 30 seconds, won; Harroun, Marmon, scratch, second; Aitken, National, scratch, third. Time, 10:52.

Five-mile race—Tilford Cowell, Chalmers-Detroit, won; Benzie, Oldsmobile, second.

Twenty-mile race—Harroun, Marmon, won; John Aitken, National, second; Basle, Renault, third. Time, 21:28 2-5.

Five-mile, free-for-all—Aitken, National, won; Harroun, Marmon, second; Basle, Renault, third. Time, 5:25 2-5.

One-mile exhibition—Oldfield in Harroun's Marmon. Time, 1:04.

Fifty-mile race—Harroun, Marmon, won; Basle, Renault, second; Cowell, Chalmers-Detroit, third. Time, 51:33. Harroun beat Basle 10 miles and Cowell 15 miles.

Ten-mile handicap—Kirscher, Darracq, scratch, won; Aitken, National, 25 seconds, second; Harroun, Marmon, scratch, third. Time, 10:55.

Effort to lower 50-mile track record by Barney Oldfield in Benz—Tire burst in eighteenth mile; declared off.

Five miles, Southern championship, open to amateurs or chauffeurs, New Orleans Railway and Light Co. trophy—Speer, National, won; Swoboda, Marmon, second; Walker, Buick, third. Time, 5:30.

Mile trial for fair grounds track record of :54 1-5, held by de Palma—Barney Oldfield in Benz. Time, :54.

Ten miles, free-for-all handicap—Basle, Renault, 1:15, won; Kirscher, Darracq, second; Harroun, Marmon, 40 seconds, third. Time, 11:21. Time of scratch car, 10:16 3-5.

Five miles, New Orleans championship, driver to be resident of city, Mayor Martin Behrman trophy—Walker, Buick, won. Time, 6:15.

Five miles, special match race from flying start—Oldfield, Benz, won; Kirscher, Darracq, second. Time, 5:17 3-5.

One hundred miles—Harroun, Marmon, won; Basle, Renault, second; Cowell, Chalmers-Detroit, third. Time, 1:47:14.

ONLY SIX GRAND PRIX ENTRIES

Paris, Nov. 12—Only six cars have thus far been regularly entered for the grand prix. The cars are three Rolland-Pilains and three Benzes. The local Benz agent said that Hemery, Henriot and Fritz Erle would drive the cars. The local Fiat agent stated that the fees for the three Fiat racers had been forwarded to the club and that if the race is held the drivers would be Nazzaro, Wagner and either Duray or Gabriel. There is lots of talk about other cars to be entered, but the manufacturers do not seem to be in a hurry to put up the binding good faith evidence, in other words the 10,000 francs fee for three cars. The entry closes by November 30, when forty-five cars must be in.

SPEEDWAY RECORDS AS THEY STAND TO DATE

THE era of the motor speedway is at hand and it is safe to predict that before another year has passed that Atlanta and Indianapolis will have rivals in the field and that in several of the big cities throughout the country there will be motor ovals built or else in course of construction. Plans now are brewing for the construction of such speedways in New York, Chicago and San Francisco, and in addition to this there are several of the old 1-mile horse tracks that are being converted into motordromes. Detroit is an example of this latter, it being asserted that several prominent horsemen, reading the handwriting on the wall, are trying to break into the newer sport. It is said a deal now is on to purchase the old Grosse Point track at Detroit and spend $60,000 in altering the grand stands and making the course suitable for motor racing. New York already has a sample of this converted horse track at Brighton Beach, but whether or not the public will prefer this style to the big speedways remains to be seen. San Antonio, Tex., has a converted ¾-mile track. However, it is probable the public will take half a loaf in preference to no bread at all.

At the present time there are but three motor speedways. One is in England and was the first one constructed. It is the largest of the three, the exact distance being 14609.11450 feet or 2 miles 1349.70483 feet, or roughly 2¾ miles. The Indianapolis speedway is 2½ miles and the one at Atlanta is 2 miles. Brooklands has a cement surface and it is said that while this is fast and safe that it costs a small fortune to keep the track in condition. Indianapolis has a brick surface, having changed from the combination of macadam and tar which was used for the first and only meet so far and which was held last August. As to its speed properties no one can say at the present time because it has not been tested as yet. However, a record-trial meet will be held there December 11, weather permitting, at which time the big cars will be sent for all records from 1 up to 1,000 miles. There will be no actual racing, but such drivers as Strang, Chevrolet, Robertson, Oldfield and Christie will participate in the attack on Father Time.

As for Atlanta, the recent meet there demonstrated that the combination of Georgia gravel and clay makes a fine surface. There was a 5-day meet held on the track and despite the fact that some thirty-five races were run, including five or six long distance events, the top dressing was if anything in better shape at the end than it was before the meet started. The only criticism that could be made of Atlanta is that the turns are not banked high enough to permit the big cars like the Fiat 120, the Benz 120 and the Christie to take them without their drivers shutting off. Had Christie been able to go wide open week before last it is more than probable a lower record than :37.7 for the mile would have been established. However, the Atlanta track people have promised that before another meet is held, which will be next March, the turns will be widened and the banking made higher.

No definite announcement has been made as yet as to the speedways at New York, San Francisco and Chicago, but it is stated by those who are in a position to know that such deals are being made quietly. In Chicago the speedway is only on paper so far, but it is asserted there are several Chicago millionaires who are interested in such a proposition. These men already have 400 acres of available land within easy riding distance of Chicago and matters have progressed so far that several meetings have been held. Of course if such a speedway is built it also will be used for aviation meets and in all probability will be an immense athletic stadium.

As at present constituted, the American speedway record table comprises about 100 different marks, taking into account, of course, the vari-

AMERICAN SPEEDWAY RECORD TABLE

RECORDS REGARDLESS OF CLASS

Dis.	Car & H.P.	Driver	Time	M.P.H.
1	Fiat, 120	Strang	:37.71	95.4
2	Fiat, 120	Strang	1:21.51	88.3
5	Benz, 120	Oldfield	4:11.3*	71.7
10	Fiat, 120	Strang	7:01.94	85.5
20	Fiat, 60	Robertson	15:31.80	77.3
50	Fiat, 60	Robertson	40:14.03	74.5
100	Fiat, 60	Robertson	1:22:35.35	72.4
150	Fiat, 60	Robertson	2:05:00.63	72.0
200	Buick, 30	Chevrolet	2:46:48.47	72.2
250	Buick, 30	Burman	4:38:57.4	53.7
1	Kilo Benz, 120	Oldfield	:26.2*	84.6

EXHIBITION RECORDS, FLYING START

1	Fiat, 120	Strang	:37.7	95.4
2	Fiat, 120	Strang	1:21.51	88.34

FREE-FOR-ALL CLASS

2	Fiat, 120	Strang	1:37.18	74.0
4	Fiat, 120	Strang	2:47.03	85.5
10	Fiat, 120	Strang	7:01.94	85.5
20	Fiat, 60	Robertson	15:31.80	77.3
30	Fiat, 60	Robertson	23:30.17	75.8
40	Fiat, 60	Robertson	31:42.36	75.7
50	Fiat, 60	Robertson	40:14.03	74.5
60	Fiat, 60	Robertson	49:15.00	73.0
70	Fiat, 60	Robertson	57:22.39	73.1
80	Fiat, 60	Robertson	1:05:34.71	73.2
90	Fiat, 60	Robertson	1:13:53.17	73.0
100	Fiat, 60	Robertson	1:22:35.35	72.4
110	Fiat, 60	Robertson	1:31:14.39	72.3
120	Fiat, 60	Robertson	1:39:38.52	72.2
130	Fiat, 60	Robertson	1:47:43.08	72.4
140	Fiat, 60	Robertson	1:56:14.79	73.5
150	Fiat, 60	Robertson	2:05:00.63	72.0
160	Fiat, 60	Robertson	2:13:44.38	71.6
170	Rainier, 50	Disbrow	2:27:42.57	69.0
180	Rainier, 50	Disbrow	2:36:23.26	69.9
190	Rainier, 50	Disbrow	2:45:02.93	69.0
200	Rainier, 50	Disbrow	2:53:48.32	69.06

450-600 CLASS

6	Fiat, 60	Robertson	4:43.37	76.3
10	Fiat, 60	Robertson	7:47.71	77.0
20	Fiat, 60	Robertson	16:27.79	72.9
30	Fiat, 60	Robertson	24:53.63	72.3
40	Fiat, 60	Robertson	33:00.00	72.7
50	Fiat, 60	Robertson	42:02.98	71.3

301-450 CLASS

5	Knox, 40	Bourque	4:45.5	63.1
10	Buick, 30	Chevrolet	8:17.52	72.4
12	Buick, 30	Chevrolet	10:12.66	70.5
20	Buick, 30	Chevrolet	16:24.17	73.1
30	Buick, 30	Chevrolet	24:31.73	73.4
40	Buick, 30	Chevrolet	32:31.82	73.7
50	Buick, 30	Chevrolet	40:32.03	73.1
60	Buick, 30	Chevrolet	49:01.60	73.4
70	Buick, 30	Chevrolet	57:30.53	73.0
75	Buick, 30	Chevrolet	1:09:47.00*	64.4
80	Buick, 30	Chevrolet	1:07:49.17	73.3
90	Buick, 30	Chevrolet	1:15:58.30	71.3
100	Buick, 30	Chevrolet	1:24:08.70	71.3
110	Buick, 30	Chevrolet	1:32:14.82	71.5
120	Buick, 30	Chevrolet	1:40:24.90	71.7
130	Buick, 30	Chevrolet	1:48:37.50	71.8
140	Buick, 30	Chevrolet	1:56:50.15	71.8
150	Buick, 30	Chevrolet	2:05:02.17	71.8
160	Buick, 30	Chevrolet	2:13:14.45	72.0
170	Buick, 30	Chevrolet	2:21:32.90	72.0
180	Buick, 30	Chevrolet	2:30:07.76	71.9
190	Buick, 30	Chevrolet	2:38:35.67	71.9
200	Buick, 30	Chevrolet	2:46:48.47	72.2
210	Jackson, 36	Ellis	3:39:53.5*	57.5
220	Jackson, 36	Ellis	3:49:37.7*	57.4
230	Buick, 30	Burman	4:15:54.4*	53.2
240	Buick, 30	Burman	4:25:46.1*	54.1
250	Buick, 30	Burman	4:38:57.4*	53.7

231-300 CLASS

5	Buick, 30	Strang	4:48.00*	62.5
6	Marmon, 32	Harroun	5:40.83	63.5
10	Buick, 30	Chevrolet	9:03.18	65.8
20	Buick, 30	Chevrolet	17:10.70	69.9
25	Buick, 30	Strang	23:20.1*	64.2
30	Marmon, 32	Harroun	26:54.43	66.8
40	Marmon, 32	Harroun	35:49.32	67.0
50	Marmon, 32	Harroun	44:48.98	66.5
60	Marmon, 32	Harroun	53:53.12	66.7
70	Marmon, 32	Harroun	1:03:01.23	66.6
75	Buick, 30	Strang	1:09:37.5*	64.6
80	Marmon, 32	Harroun	1:12:08.43	66.5
90	Marmon, 32	Harroun	1:21:12.06	66.5
100	Marmon, 32	Harroun	1:30:08.31	66.5
110	Marmon, 32	Harroun	1:40:14.85	65.8
120	Marmon, 32	Harroun	1:49:26.94	65.7

161-230 CLASS

4	Chalmers, 30	Matson	4:05.5	57.6
5	Stoddard, 25	Schweitzer	5:13.4*	57.5
10	Chalmers, 30	Matson	9:49.46	61.1
20	Chalmers, 30	Knipper	19:51.00	60.4
24	Chalmers, 30	Knipper	23:40.42	60.8
30	Chalmers, 30	Knipper	29:41.00	60.6
40	Chalmers, 30	Knipper	39:40.00	60.5
50	Buick, 18	Nelson	50:36.00	59.2
60	Buick, 18	Nelson	60:00.00	60.0
70	Buick, 18	Nelson	1:10:31.00	58.5
80	Chalmers, 30	Knipper	1:20:29.00	59.7
90	Buick, 18	Nelson	1:30:28.00	59.6
100	Chalmers, 30	Knipper	1:40:46.82	59.5

* Made at Indianapolis; all others made at Atlanta

ous class records, which are interesting now that the A. A. A. has divided the competition field into five divisions as follows: Class 1, cars of from 451 to 600 cubic inches piston displacement and of a minimum weight of 2,400 pounds; class 2, 301 to 450 and 2,100 pounds minimum weight; class 3, 231 to 300, and minimum weight 1,800 pounds; class 4, 161 to 230 and minimum weight 1,500 pounds, and 160 and under and minimum weight of 1,200 pounds. In addition and also figuring in the record table are the exhibitions and the free-for-alls. Atlanta holds all but eight of the records. Indianapolis gets those simply because the distances, 5, 25, 75 miles and the kilometer, and because it had a race more than 200 miles in length. The Atlanta track being 2 miles instead of 2½ like Indianapolis, there has not been a 5-mile race as yet.

ATLANTA TIME REPORT FILED

Atlanta, Ga., Nov. 20—The Atlanta Automobile Association has received from E. H. Warner, chief timer during the recent 5-day meet on the speedway, a complete report of the time made in the long-distance events that were the features of the speed carnival. While Mr. Warner gave out the time of the first three cars in each contest, yet he was not in a position last week to report all the intermediate time, which of course is interesting to those who look into the detail of such races.

Six World's Records Made By Hemery in a Big Benz

London, Nov. 10—Six new world's records were established yesterday at Brooklands by Hemery in the 130-horsepower Benz, the timing being done by a new electric apparatus which records 1-1000th of a second. The new records are:

	FLYING START		STANDING START	
Distance	Time	M.P.H.	Time	M.P.H.
1 kilometer ...	:17.761	125.6	:31.326	71.3
½ mile	:14.76	127.6	:25.566	70.3
1 mile	:31.55	115	:41.268	87.2

A series of record trials was held at Brooklands speedway last Wednesday. Georges Boillot, driving a single-cylinder Lion-Peugeot voiturette with a bore of 102 millimeters and a stroke of 250 millimeters, broke all the existing records in his class. He went 50 miles in 43:35.9; 100 miles in 1:27:48.5; ½ mile from a flying start in :24.8—at the rate of 72 miles and hour—and in the hour he covered 68 miles 688 yards. The car never varied a second a lap and the last half of the journey was faster than the first half. The engine of this fierce little speed-bug is a good 3 feet 6 inches over all; it has inlet valves and three exhausts arranged radially around its cylinder head and operated by a plantation of tappet rods. It also has three spark plugs and two magnetos.

Friday last A. Smith in a 60-horsepower six-cylinder Thames set up new figures for the 60-horsepower class as follows: 50 miles, 34:02.5, 87.17 miles per hour; 89 miles 892 yards in 1 hour; 100 miles, 1:06:53.49, 89.70 miles per hour; 150 miles, 1:44:30.16, 86.06 miles per hour; 173 miles 81io yards in 2 hours, 87 miles per hour; 200 miles, 2:17:56.36, 87 miles per hour 261 miles 1,653 yards in 3 hours; 300 miles, 3:30:17.45, 85.61 miles per hour.

RACE FOR THE 231-300 CLASS

Miles	21 Marmon	18 Chalmers	38 Renault	29 Buick
10	9:07.07	9:54.87	10:48.58	8:42.60
20	18:01.52	19:41.94	21:20.00	17:10 70
30	26:54.43	29:25.21	31:52.94	32:21.55
40	35:49.32	39:14.53	42:27.25	43:49.60
50	44:48.98	49:00.47	54:56.92	52:18.40
60	53:53.12	58:46.36	68:36.76	61:04.03
70	63:01.23	68:31.10	76:15.95	77:26.53
80	72:08.43	78:12.96	86:47.69	87:05.42
90	81:12.06	87:59.17	99:04.76	101:46.07
100	90:08.31	97:45 03	109:32.65	111:22.96
110	100:14.85	107:30.43	119:53.04	120:58.17
120	109:26.94	117:22.92	129:15.20	129:30.13

FIFTY-MILE FREE-FOR-ALL WON BY ROBERTSON IN FIAT 60

Miles	1 Fiat	3 National	24 Marmon	30 Fiat	19 Chalmers	16 Apperson	15 Chalmers	9 Rainier
10	7:51.32	8:22.24	8:53.44	7:18.29	8:29.95	8:26.40	8:29 18	8:59.95
20	15:31.80	16:32 03	17:28.50	.....	16:49.32	16:50 04	16:49.83	17:55.38
30	23:30.17	24:42.23	26:10.75	.....	26:49.26	.....	.....	26:58.93
40	31:42 36	33:08.97	34:50 47	.....	35:17.06	.....	.....	36:00.49
50	40:14.03	43:11.41	43:30.56	.....	43:48.28	.....	.....	44:38.55

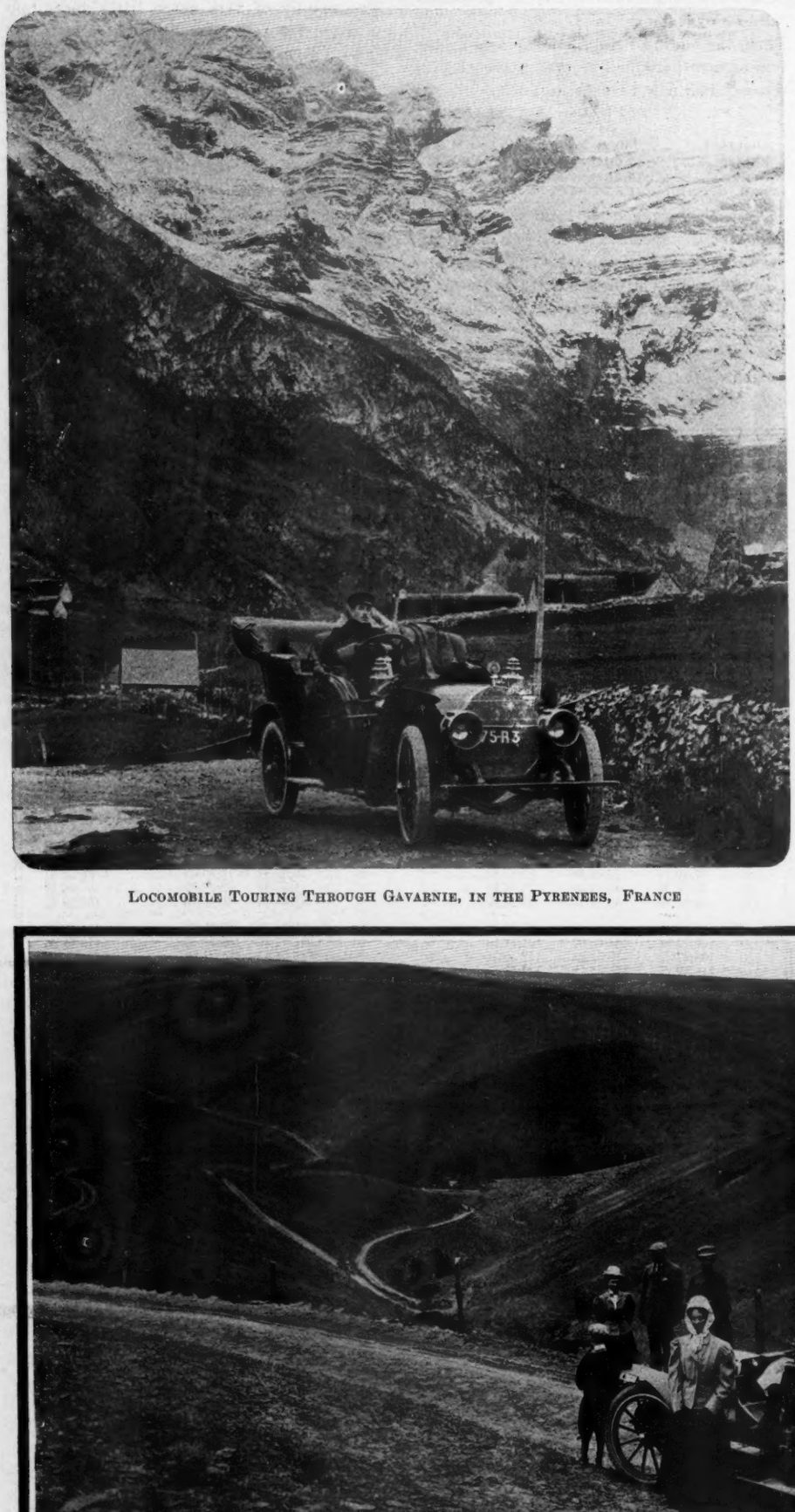
TWO-HUNDRED MILE RACE, 301-450 CLASS, WON BY CHEVROLET

Miles	31 Buick	19 Chalmers	15 Chalmers	3 National	9 Rainier	24 Marmon	2 Renault	33 Renault	6 National
10	8:17.52	8:32.28	8:35.58	8:17.53	9:05.27	9:17.77	9:22.94	9:29.78	21:51.45
20	16:24.17	17:00.52	17:00.52	.....	42:49.35	18:19.81	18:22.43	18:46.54	30:09.61
30	24:31.73	25:24.99	25:25.39	.....	55:13.64	27.07.28	27:24.12	28:28.68	38:21.88
40	32:31.82	33:46.50	33:51.48	.....	.....	35:53.20	36:18.02	38:02.12	50:04.92
50	40:32.03	42:10.54	42:22.38	.....	.....	44:33.43	45:15.88	.....	58:21.03
60	49:01.60	50:39.26	50 52.52	.....	.....	53:06.84	54:08.13	.....	66:35.51
70	57:30 53	59:14.88	59:28.45	.....	.....	61:36.88	62:47.56	.....	74:50 93
80	67:49.17	72:09.96	67:57.33	.....	.....	70:06.57	71:29.05	.....	86:50.61
90	75:58.30	80:18.40	76:33.68	.....	.....	78:37.03	80:07.31	.....	95:06.17
100	84:08.70	88:27.20	85:12.95	.....	.....	87:09.75	88:43.28	.....	103:16.45
110	92:14.82	96:36.48	95:22.08	.....	.....	95:37.79	97:19.43	.....	111:23 51
120	100:24.90	104:45.97	103:55.74	.....	.....	104:02.30	105:47.75	.....	119:28.06
130	108:37.50	112:54.43	112:38.56	.....	.....	112:24.03	114:21.28	.....	.....
140	116:50.15	121:03.19	124:42.82	.....	.....	120:45.77	122:50.54	.....	.....
150	125:02.17	129:19.35	133:11.93	.....	.....	129:08.84	136:11.47	.....	.....
160	133:14.45	139:06.93	141:36.45	.....	.....	137:28.47	144:57.47	.....	.....
170	141:32.90	147:31.05	150:02.00	.....	.....	.....	158:17.24	.....	.....
180	150:07.76	156:08 86	158:30.24	.....	.....	.....	167:17.81	.....	.....
190	158:35.67	165:05.25	166:55.51	.....	.....	.....	176:14.48	.....	.....
200	166:48.47	173:33.91	175:15.61	.....	.....	.....	185:10.32	.....	.....

CITY OF ATLANTA RACE, 200-MILES, 450-600 CLASS, WON BY DISBROW IN RANIER

Miles	No. 9 Rainier	No. 1 Fiat	No. 2 Renault	No. 33 Renault	No. 21 Marmon	No. 26 Fiat	No. 31 Buick	No. 19 Chalmers	No. 24 Marmon	No. 15 Chalmers	No. 16 Apperson
10	8:57.64	8:10.94	9 29.72	9:59.43	9:04.23	8:33.25	8:37.42	8:49.49	9:00.73	9:04.51	9:09.82
20	17:38.94	16:27.79	18:34.70	19:28.44	20:53.80	17:03.50	16:59.43	17:06.27	17:40.15	17:51.30	17:56.21
30	26:17.17	24:53.63	27:29.32	28:47.92	29:46.27	25:31.50	25:15.24	Out	26:23 07	26:59.74	26:57.66
40	34:57.14	33:00.96	36:41.65	37:56.82	38:31.68	33:53.48	33:29.68	.....	34:59.17	35:02.93	35:45.44
50	43:36.25	41:02.90	45:16.76	47:10.64	52.07.30	42:14.38	41:39.81	.....	43:37.50	44:41.99	44:27.56
60	52:13.55	49:15.00	53:57.94	56:33 93	60:54.96	52:42.30	49:51.71	.....	52:15 59	54:00.44	53:03.83
70	60:50.20	57:22.39	62:37 49	66:10.11	69:29.10	62:05.93	58:07.38	.....	60:50.62	Out	60:52.85
80	69:29.24	65:34.71	71:19.07	75:19 08	78:08.77	71:19.38	67:46.37	.....	69 35.05	.....	70:27.57
90	78:09.11*	73:53.17	80:03.17	86:48.55	86:64.94	79:39.25	Out	.....	78:17.73	.....	79:14.15
100	86:45 57	82:35.35	88:47.64	96:31.34	100:19.28	88:02.00	.....	.....	88:11.98	.....	90:18.48
110	96:26.22	91:14.39	97:29.73	105:55.52	131:47.86	96:27.78	.....	.....	Out	.....	Out
120	104:07.74	99:38.52	106:13.24	115:25.24	142:29.03	107:25.02	.....	.....	.....	.....	.....
130	112:50.76	107:43.08	114:56.85	124:33.25	153:13.77	Out	.....	.....	.....	.....	.....
140	121:30.37	116:14.79	123:39.87	133:58.50	164:01.76	.....	.....	.....	.....	.....	.....
150	130:15.68	125:00.63	132:22.30	143:11.45	174:53.15	.....	.....	.....	.....	.....	.....
160	138:56.43	133:44.38	141:13.63	152:37.03	185:47.88	.....	.....	.....	.....	.....	.....
170	147:42.57	154:25.43	151:47.90	163:16.69	Out	.....	.....	.....	.....	.....	.....
180	156:23.26	161:59.38	160:57.83	172:58.77	.....	.....	.....	.....	.....	.....	.....
190	165:02 93	169:34.85	169:54.34	182:30.76	.....	.....	.....	.....	.....	.....	.....
200	173:48.32	177:47.05	178:43.93	193:41.87	.....	.....	.....	.....	.....	.....	.....

Motor Rambles in Foreign Lands



LOCOMOBILE TOURING THROUGH GAVARNIE, IN THE PYRENEES, FRANCE

NEW YORK, Nov. 22—An ideal European trip of 6,700 miles through England, France and Algeria was made recently by A. Lowes Dickinson, a member of the Automobile Club of America, in a 40-horsepower Locomobile touring car.

After completing 2,000 miles in England without difficulty the car was shipped to Boulogne, France. Striking out over the Route Nationale and into the valley of the Somme, the first night stop was made at Amiens, 76 miles from Boulogne. After spending a morning in exploring the cathedral the party threaded its way over the undulating roads and chalk table land through Breteuil, Beauvais, Allone and Meru, at which point the beauty of the country became greater. At Conflans the Seine was crossed for the first time, the route then proceeding through the Foret de St. Germain country.

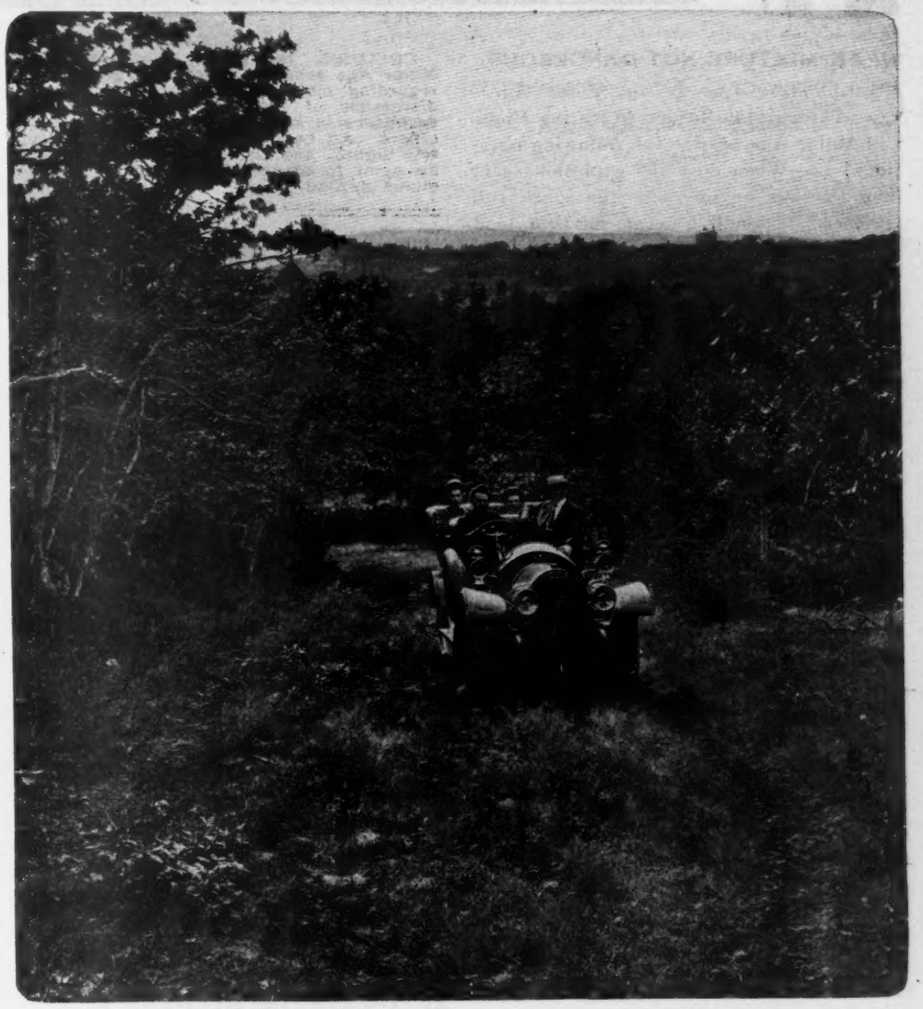
From the French capital jaunts were made through the Chateau country, St. Cyr, Rambouillet, Voisins, Chartres, etc.

Several days were then spent journeying a few hundred miles through Coarraze, Lourdes, Pau, the Tournay country, before the Mediterranean was sighted. The road from here through Aix, Cannes and Nice was uninteresting, being much cut up with wine traffic. Pushing onward the following day on the wonderful Corniche d'Or road, along the beautiful country of the Gulf of St. Tropez, and through the winding mountains with their gorgeous scenery, the ride into Marseilles was a delight. Five weeks were spent in Algeria by the party. The return trip was made via Marseilles.

PICTURESQUE SCENERY NEAR POMEROY, WASH., DISCOVERED BY W. W. RICHARDSON IN A FRANKLIN

Climbing Oregon's Mount Neah-Kah-Nie

PORTLAND, Ore., Nov. 20.—The most romantic motor road in Oregon is in course of construction around Neah-Kah-Nie mountain in Tilamook county. Emerging from an embowered trail of alders and abruptly beginning its encircling trip around the steep mountain, the new road, over 5 miles of which have been completed, is actually blasted out of the solid rock mile after mile. Toward the west sweeps the broad expanse of the Pacific ocean, breaking with ceaseless roar 650 feet below the road. Looking about at an angle of more than 60 degrees the tip-top of the grand mountain penetrates the blue of the Oregon sky 1,800 feet above the level of the sea. Creeping along this precipitous exposure the Neah-Kah-Nie road has been pushed slowly toward the north, offering one of the most thrilling and fascinating roadways in the state, if not on the Pacific coast. Upon its completion and a bridge across the Nehalem river, to connect with the Pacific Railway and Navigation Co., there will be a continuous road for the first time in the history of the state along the edge of the Pacific from Cape Lookout through Tilamook City and around the bay, north along the sand beach at Garibaldi, across the Nehalem, through S. G. Reed's 1,000-acre ranch to the base of Neah-Kah-Nie mountain. On a gentle grade, attaining an elevation no higher than 670 feet in 10 miles, the road encircles the huge rock, reaching sea level again at Neah-Kah-Nie creek, behind the mountain. Following the back trail across Cape Falcon a couple of miles further only 2 miles will remain to be built.



ON THE WAY TO THE TOP OF MOUNT NEAH-KAH-NIE IN OREGON

PORTION OF THE VALLEY ROAD BELOW NEAH-KAH-NIE, OREGON, PART OF INTERESTING MOTOR ROUTE

The Readers' Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

WEAK MIXTURE NOT DANGEROUS

CLINTON, IA.—Editor Motor Age—Through the Readers' Clearing House will Motor Age answer the following questions? 1—When does the explosion occur in a Peerless engine with the spark full retarded? 2—Will a weak mixture tend to make a gasoline engine kick? The writer cranked a four-cylinder motor with spark advanced to center, the engine ran 1 or 2 seconds, then stopped; he cranked again with the spark in same place, this time it kicked. As soon as the gasoline was turned on the engine did not kick any more.—T. S.

1—Slightly past top dead center. 2—No. In cranking a motor retard the spark.

DES MOINES-TEXAS ROUTE

Des Moines, Ia.—Editor Motor Age—Will Motor Age furnish me with a route from Des Moines, Ia., to Brownsville, Texas.—E. R. Stotts.

Motor Age would suggest that you go by way of St. Joseph, Mo., then south through eastern Kansas to Kansas City in order to avoid western Missouri and particularly crossing the bottoms en route to Kansas City. From Kansas City go via the Santa Fe trail through Rosedale, Shawnee, Olathe, and Ottawa. From Ottawa on the route lies in an angling direction to the southwest, along the old Santa Fe trail for about 15 miles and then turns off west toward Waverly; thence through Emporia, Newton, Wichita, Enid via Wellington, Caldwell, Medford and several smaller towns. From Enid to El Reno and then Oklahoma City. Eastern Oklahoma is still very rough and most streams have to be forded, and as Oklahoma City is not much out of the way it would be better to go that way. From Oklahoma City the route is via Fort Worth, Waco and Austin. Motor Age invites additional information on this route from those in a position to give such.

LONG OR SHORT-STROKE

Moline, Ill.—Editor Motor Age—Why is there such a diversity in the construction of gasoline motors in regard to bore and stroke? Some motors have, say 4-inch bore and 4¼-inch stroke or more, some have 4-inch bore and a 4-inch stroke, and others have a 4-inch bore and 3¾-inches, or even less, stroke. It seems that there ought to be a definite proportion in regard to bore and stroke, whatever that proportion might be, best suited for all gasoline motor cars. The great majority of cars built in this country seem to be supplied with motors that have a long stroke. Does the same apply to cars built in foreign countries? Can a four or six-cylinder car with a short stroke be driven slower on high speed than a long-stroke car? What effect will the different strokes have on the speed and hill-climbing power of a car, and what are the advantages and disadvantages in general, if it is conceded that a long stroke is preferable to a short stroke? Why, then, are not all motors constructed that way?—Reader of Motor Age.

All motors will be alike when all men think alike, but not until then. If the piston speed is the same for all, then, according to the A. L. A. M. formula, the power will be the same. In all truth, to know the power is to test the motor. Foreign cars introduced the long stroke 2 years ago when in grand prix racing cars the cylinder bore was limited to 6.1 inches but the stroke left optional. As a result motors with 8-inch strokes were built and it soon was discovered that it is possible to actually increase the horsepower by reducing the bore and adding to the stroke. A long-stroke motor has shown itself preferable to a short-stroke one on steep hill-climbing work, whereas the short-stroke has shown greater speeds on level roads and tracks.

AUTOMATIC OR MECHANICAL

Grand Rapids, Mich.—Editor Motor Age—I have a four-cylinder motor which has automatic intake valves which I am going to change to mechanical. Will Motor Age inform me what is the best material to use in making the cams? The motor is of the valve-in-the-head type, 4¾ by 5 inches. I wish to know the opinion of Motor Age as to the timing of the valves. Will Motor Age tell me in some simple way when both valves should open and close?—J. H. Tanis.

The cams, if they are not integral, can be made of any alloy steel that will take on glass hardness as a result of heating and quenching, as Krupp E.F.60-0, or, almost any good tool steel. It also will be possible to use low carbon steel; this product, after the cams are shaped, will have to be cemented, to do which requires that the parts be packed in bone and placed in a muffle furnace, after which the temperature should be raised to 900 degrees centigrade and held so for several hours, say 8. When the case has grown to a depth of 1-32 inch, which it will in the time given, the parts should then be quenched in salt water, from the temperature of cementing, and if they are then drawn to about 250 degrees centigrade they will be in good fettle. If the cams are integral the whole shaft, cams and all, can be made from 20 carbon steel, and in hardening, it will be necessary to cover the shaft with clay while the cams are being cemented. The clay will prevent the shaft from taking on hardness while the cams can be made glass hard. In relation to timing, Motor Age published an article by Thomas J. Fay, October 7, under the head of "Notes on Timing of Gasoline Motors," and the information desired by you will be found therein on page 19.

COMPRESSION AND VALVE SIZES

Newark, N. J.—Editor Motor Age—Kindly advise me through the Readers' Clearing House what should be the compression of a gasoline engine with cylinder sizes 4½ by 5 inches. Will the compression increase with increased speed of the engine, and if so, in what proportion? Where should the intake valve open and close? Where should the exhaust valve open and close? What proportion should the valves be to the piston?—A Reader.

1. Cold compression, in a water-cooled motor, should be about 60 pounds per square inch—gauge—if the motor is not used for racing. If the racing problem is involved—which is a matter that disregards flexibility, to some extent, at any rate—the cold compression may be as high as 80 pounds per square inch—gauge—and within these two limits the designer is at liberty to choose for himself. The compression will decrease with speed, due to losses in the transfer of the mixture and back pressure of the exhaust, as well as to other pumping factors. The timing question was handled by Thomas J. Fay in an article entitled, "Notes on Valve Timing of Gasoline Motors," in Motor Age of October 7, page 19. The valves, if they are to be for the greatest valve efficiency, should be half the bore of the cylinder in diameter, but if noise is to be eliminated it is better to use somewhat smaller valves; loss of power will increase, due to valve inefficiency, inversely proportional to the square of the diameter of the valves, so that it is necessary to reduce from the large size here

TWO-CYCLE CONSUMPTION

Carthage, S. Dak.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly give me information on the following: 1. What other makes of cars use the two-cycle motor besides the Elmore and the Atlas? 2. Is there any real successful so-called self-starting device on the market? I have seen a number of them, but some are complete failures and

others are only partially successful. 3. Does a two-cycle engine use more gasoline per mile than a four-cycle one?—Reader.

1. The American Simplex, described in a recent issue of Motor Age, is a two-cycle car.

2. Yes; Winton and, perhaps, other cars, use self-starters.

3. Not necessarily; this is a matter that can not be decided offhand; every individual motor made must be actually tested to ascertain its fuel economy.

FIRING LOZIER SIXES

New York—Editor Motor Age—On page 27 of Motor Age, issue October 28, regarding the firing sequence of six-cylinder cars, it is stated that a Lozier six fires 1-4-2-6-3-5. While this may have been the sequence of some of the earlier Lozier sixes, the firing sequence for over a year past has been 1-2-3-6-5-4.—Lozier Motor Co.

GLIDDEN SUGGESTION

Bardstown, Ky.—Editor Motor Age—I have a suggestion for the 1910 Glidden tour. Start at Chicago and go to Indianapolis, French Lick Springs, Louisville, Abbey of Gethsemane, Lincoln memorial farm, Mammoth cave, Nashville, Chattanooga, Chickamauga, Atlanta, and thence to New York over the national highway. —Claude Wilson.

AUTOGENOUS WELDING PRACTICE

Sumter, S. C.—Editor Motor Age—I am very much interested in autogenous welding. Could not this gas be mixed in the same reservoir? For instance, pump in acetylene to a pressure of 25 pounds, and then couple on the oxygen pipe and pump in 33 pounds, giving a total pressure of 58 pounds. Is there any danger in mixing these gases? Would 58 pounds be sufficient pressure to weld cracked cylinders, etc.? —H. W. C.

The result would be disastrous; the one safe way is to conform to the present practices.

REO TIRE RECORD

New Orleans, La.—Editor Motor Age—While in Canada last summer with my Reo a mileage of 3,692 was made on Michelin tires without a puncture or trouble of any kind. I should like very much to know whether this stands as a record or not.—Subscriber.

Motor Age believes this is a fine record. Perhaps some others with experience of this sort have something to tell.

LEGAL RIGHTS OF TOWNS

Quincy, Ill.—Editor Motor Age—The Illinois motor vehicle law prohibits cities and villages from passing ordinances "limiting or restricting the use of motor vehicles." The Illinois statute on cities and villages gives to them the right to "direct, license and control all vehicles carrying loads within the city." I would be glad if Motor Age would advise me if there has been a court decision or an official opinion sufficient to settle the question as to whether cities have the right to pass ordinances establishing rules of the road governing all vehicles. I refer to such ordinances as prohibit vehicles from driving on the left side of the street, stopping with the left side to the curb, turning around in the middle of the block, etc.—E. J. Taylor.

Sidney S. Gorham, ex-secretary of the Chicago Automobile Club, the lawyer who drew up the present Illinois law, cannot remember that there ever has been any court decision relating to the rights of cities and towns to pass such ordinances, but as he interprets the present state statute there is no disposition on the part of the state to take away from towns and villages the right to exercise police power over traffic, although they are forbidden to pass any speed regulations. Mr. Gorham recalls that there is an old state law which requires all vehicles to pass to the left of an overtaken vehicle, which he believes is a precedent for the more modern rules of the road. An instance of a city's right to enact such legislation is found in Chicago, where there is a new ordinance which prohibits owners from leaving their cars standing on the streets in the business district for more than 1 hour without an attendant in charge. This certainly is regulating traffic and seems to come within the scope of your question. Inasmuch as no one so far has questioned Chicago's right to pass such an ordinance it would seem as if it has established a precedent which you might well follow.

WANTS WEIGHT-TO-LOAD RATIO

South Bethlehem, N. Y.—Editor Motor Age—The man who understands has visions of a high-powered car with say 40-inch wheels with just enough weight in the car to give the needed margin of safety under all practicable and reasonable conditions. Such a car would perform delightfully under those conditions, and under favorable conditions would perform superlatively. The man who understands cannot forget that he is penalized in enjoyment and purse because of the extra weight he always must carry that the same model car may be strong enough to withstand the terrific strains of reckless and foolhardy driving; that hated ponderosity built into cars to enable some makers, agents, owners and drivers to have a text for their idle boasts that their cars successfully withstand such and such terrific strains. The pleasures of pure motoring have staled on these latter and only cars that can perform stunts can interest them. It would be inconsistent to claim that the same model car could satisfy these two distinct classes. The ratio of car to load now is not less than three to one. The tendency is for more power and the more power the more ponderosity, and the more ponderosity the more power is required to handle it and so on and on. The writer believes it would not require great courage on the part of a maker to produce a safe, light, swift car for sane drivers and advertise it as such because there are many who appreciate the fact that the ratio of car to load is altogether too great for the highest satisfaction in motoring. A car devoid of the extra weight that makes it a burden to itself would find hosts of friends.—S.

VARYING FUEL INJECTIONS

Chicago—Editor Motor Age—I have a plan to build a two-cycle motor that will force pure cold water, under any desired pressure, into the combustion chamber, cleaning the same perfectly. The motor is simple and without complications. The fuel would be fed by pump and I desire to know if the motor could be made flexible by varying the amount of the fuel fed, the volume of air in the chamber to be the same at all times.—D. Green.

Yes. It is customary in some motors using fuel injection by pump to vary the length of the pump stroke when changing the motor speed.

EXPERIENCE AND PROPHECY

Decatur, Mich.—Editor Motor Age—Six years' experience driving a motor car on country roads disclosed more trouble with tires and springs than all other parts, and, at least so far as tires are concerned, this probably is the experience of the majority of motor car drivers. There is yet much to be done before the really practical car so many are hoping for is perfected, and for this the tires will, perhaps, be the most difficult to develop; but a happy medium between the expensive and unreliable pneumatics and the cheaper but jarring solid tires will be found. Some relief from present conditions must be found if the motor car industry is to continue growing as it should. Once let prospective buyers learn that the probable upkeep cost of tires alone will annually be from 20 to 40 per cent of original cost of the car and they will be slow to buy the rapidly increasing productions for which makers are planning. There already are several patented rubber tires and other devices to take the place of pneumatics, but none that the price and general efficiency of which seems to merit adoption. It would seem that some form of springs might be devised which would be more perfectly self-adjusting to varying loads, practically unbreakable and of standard pattern so that when one did break it could be quickly and easily replaced. In the matter of furnishing repairs there is need for very great improvement and motor car makers might well pattern after the repair departments of harvesting machine companies and others. It should be possible for a driver to wire for a part and receive it by return train, instead of waiting from 1 to 3 weeks, as now happens. With the coming of satisfactory tires and springs, simplified two-cycle, air-cooled or other motors, the real boom in motor cars will be on. In this connection if drivers could

be improved so that none would attempt to do more than 20 or 25 miles per hour on public roads there would be far less damage to riders, cars, roads and sentiment. This desirable improvement might be brought about either by severe laws or mechanical governors on motors.—A. E. Lawrence.

SUCKING CARBURETER SOUND

Bartow, Fla.—Editor Motor Age—I would like to know through the Readers' Clearing House how the sucking noise through the Schebler carbureter, which is fitted to my two-cylinder Pierce-Racine car, can be remedied.—P. B. Johnston.

It may be that the noise is due to the fact that the compensating or auxiliary air valve does not seat properly. Then, again, the stem of this valve may be slightly bent, thus interfering with its action. If the stem is bent, putting in a new valve is the easiest solution.

DISTINGUISHING INFERIOR CASINGS

Moline, Ill.—Editor Motor Age—Will Motor Age tell me how a second casing and tube can be distinguished from first-class stock. I am well satisfied that I have been imposed upon and do not wish to be again by unscrupulous dealers. Does a motor with a 3¾-inch bore and 4¾-inch stroke actually develop the 22-horsepower as figured? One dealer admits this bore and stroke develops 18-horsepower, dynamo test, while another claims 22-horsepower, though his stroke is 1 inch longer.—Reader.

It is practically impossible for a buyer to distinguish between a first-class casing and what might be termed a second-class one. Manufacturers generally have a special mark which they put on and by means of which they are able to distinguish between firsts and seconds. If a casing bears a serial number it is a good indication that it is a first, whereas few seconds are so marked. A motor with a 3¾-inch bore and 3¾-inch stroke has a rating of 22.5 horsepower according to the A. L. A. M. formula. This motor would be turning over at 1,600 revolutions per minute to give this rating. A motor with 3¾-inch bore and 4¾-inch stroke would have the same rating according to formula, but it would show the power at 1,300 revolutions per minute. The A. L. A. M. formula is based on a piston speed of 1,000 feet per minute and where the stroke is shorter the crankshaft speed must be greater than where a longer stroke is used.

THE WAITE FRICTION SYSTEM

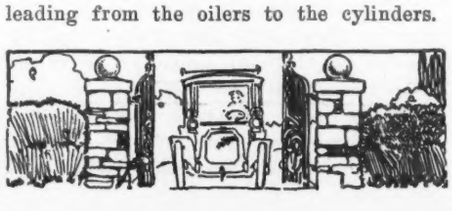
Milnor, N. Dak.—Editor Motor Age—Through the Readers' Clearing House will Motor Age inform me whether the improved Waite friction drive of the Petrel cars is the same as the friction drive—in all important features—used in the Lambert and Cartercars? Is the Petrel motor manufactured by that company? If not, what is the name of the company that makes the Petrel engines? In all the friction transmission systems by which the power is carried to the rear wheels through jackshaft and one or two chains is there not more loss of power than by direct shaft drive? To my mind the jackshaft stands in the same relation to the motor that the rear axle does when connected by a shaft. Have tests shown that the friction drive consumes less power—has less friction—than the ordinary selective transmission used on most cars of as much as 30-horsepower?—F. W. Vail.

The general design of the friction drive system used on the Petrel cars is the same as that on the Lambert and Cartercar, namely, there are but two elements in the friction set, that is the disk on a continuation of the crankshaft, and the friction wheel on a cross jackshaft. To insure contact the disk is forced back against the wheel, so that the jackshaft can be rigidly mounted. A Beaver motor is used in the Petrel car, it being manufactured by the Beaver Mfg. Co., Milwaukee, Wis. There have been few tests and consequently little information given out on the efficiency of friction transmissions. The fact that cars with these types of transmission are in general use in all parts of the country is sufficient proof of the serviceability of it, and beyond which few owners care to investigate. It is generally satisfactory to an owner if the system operates to his satisfaction.

TWO RADIATOR TYPES

Bardstown, Ky.—Editor Motor Age—Through the Readers' Clearing House will Motor Age state which is the most efficient, the cellular or honeycomb type of radiator? Which is the more expensive? Is it possible to make a good circulating oil system without having the pipes lead from an oiler to the cylinders, that is just with the pump? How does the oil get into the cylinders in the Chalmers-Detroit 30? —Claude W. Wilson.

The cellular radiator is more efficient. Many who have made a study of radiators claim that its efficiency ranges from 25 to 40 per cent greater than that of the tubular. The cellular is much more expensive to manufacture, frequently from 100 to 150 per cent more so. In America the tubular is in greater use, doubtless many manufacturers figuring it is better policy to give a radiator of this type which is much cheaper to manufacture but gives the necessary efficiency and is particularly rugged for rough road duty. The cylinders in the Chalmers-Detroit 30 are lubricated from splash in the crankcase. There are a great many cars on the market at the present time without oil pipes leading from the oilers to the cylinders. A big fraction of cars deliver oil to the crankshaft bearings and thence direct it through drillings in the crankshaft to lower connecting rods, the overflow from these supplying the splash which cares for the cylinder walls.



HORSEPOWER ON LONG STROKES

Detroit, Mich.—Editor Motor Age—Last year I bought a car that was listed as a 30-horsepower car and so described by Motor Age last fall or winter. The size of the motor was 4¼ by 4½. Now, this year I have purchased the same make of car with the cylinders 4¼ by 5, with the crankshaft offset ¾ inch. The increase in length of stroke and offset crankshaft should increase the horsepower. The factory rates the car this year at 30 to 35 horsepower. In Motor Age, October 21, 1909, appeared a description of this car and it was rated at 28.9 horsepower. It is a four-cylinder car. Now what I want to find out is what was the horsepower of the car I had last year, and really what is the horsepower of the car I have bought for next year. When at the factory I was shown a diagram, etc., where this car with the 4¼ by 4½ motor developed 34 and some fraction horsepower. The wheels of this year's model are 32 by 4 inches, and the wheels on next year's car will be 34 by 3½. The actual weight of my car, as I had it equipped and loaded with accessories, water, gasoline and oil, was 2,900 pounds on the scales, but I do not know, of course, what next year's car will weigh, equally completely equipped. What I want to find out is what was the horsepower of the 1910 model with 4¼ by 4½ motor, and what will be the horsepower of the 1910 model with 4¼ by 5 motor and with the three-quarter offset crankshaft?—E. P. Andrew.

According to the A. L. A. M. horsepower formula your car of last year had a rating of 28.9 horsepower, which is based on a piston speed of 1,000 feet per minute. By piston speed is meant the total distance one of the pistons travels per minute.

Each revolution of the crankshaft one piston with a 4½-inch stroke travels 9 inches, so that when this motor was showing 28.9 horsepower its crankshaft rotation would be practically 1,400 revolutions per minute. For next year, because your cylinders have the same bore, or diameter, the motor according to this formula will have the same horsepower rating, namely, 28.9 horsepower. As the stroke is 5 inches for next year there will be a piston travel of 10 inches instead of 9 for each revolution, and the motor will show its rating 28.9 horsepower at 1,200 revolutions per minute instead of 1,400 with a 4½-inch stroke. You will understand that the A. L. A. M. horsepower formula is used more as a general guide rather than an accurate horsepower estimate. Many manufacturers test their motors out on the electric dynamometer with a bank of lights, with which their motors may show higher ratings than the formula gives them.

Legal Lights and Side Lights

ADJUST MARYLAND RATES

THAT it is the intention of the members of the Automobile Club of Maryland and the state motor car commission to work hand in hand both for the welfare of the owners of cars, the improvement of the Maryland roads and for the interest of the general public was manifested at the conference between members of the two bodies at the club headquarters, November 17. The most important outcome of the meeting was the compromise reached in regard to the tax feature of the proposed Swann motor vehicle law—the bill prepared by Colonel Sherlock Swann, of the state motor car commission, to be presented to the general assembly of Maryland which meets in January with the view of having it enacted into a law. The rates agreed upon at the conference were:

Twenty horsepower or less	$ 6
More than 20 and not more than 40 horsepower	12
More than 40 horsepower	18

The comparative figures suggested previously by the club and commission were:

AUTOMOBILE CLUB OF MARYLAND

Twenty horsepower and under	$ 6
Over 20 to 30 horsepower	9
Over 30 to 40 horsepower	12
All cars over 40 horsepower	15

MOTOR CAR COMMISSION

Twelve to 20 horsepower	$ 6
More than 20 and to 30 horsepower	12
More than 30 and to 40 horsepower	18
More than 40 horsepower	24

The club members and representatives of the commission also agreed to fix the salary of the commissioner of motor vehicles at $3,000 a year. State Senator J. Charles Linthicum, chairman of Governor Crothers' commission, and President C. Howard Millikin, Vice-President Osborne I. Yellott and Joseph M. Zamoiski, of the club, also spoke at the conference.

ROAD LAWS UNCONSTITUTIONAL

A sweeping decision, declaring unconstitutional all road laws of the state, except the one providing for direct benefit assessments, has just been rendered by the Indiana supreme court. This decision leaves the validity of millions of dollars worth of road bonds in doubt and practically all road-building under way in the state has been summarily stopped. Contractors refuse to proceed unless they have assurance they will be paid for their work. There have been a number of ways in which roads could be built in Indiana and in brief the methods have been as follows: In townships having an incorporated town of fewer than 30,000 inhabitants, the county commissioners have issued bonds, being reimbursed by a township tax; another law has made it mandatory for the county commissioners to order a road not exceeding 3 miles in length and connecting two improved highways on petition of fifty property owners in a township, this expense being met as above mentioned; roads also have been built by a township road tax, without bonds being issued, and another law has provided that the cost be assessed against all property within 1 mile of the road built. The court holds all laws and sections of laws, except the latter, are unconstitutional and are class legislation. The decision was reached on an appeal from Hamilton county, where the court had refused to enjoin the county commissioners from ordering a highway for which $40,000 worth of bonds were to be issued.

WISCONSIN TOWN SUED

Edward Collier, the superintendent of testing for the Rambler works at Kenosha, Wis., has filed claims for damages against the town of Salem. On October 6, Collier, driving a Rambler, attempted to pass a horse and buggy on a highway not more than 9 feet wide, and was thrown down a high embankment. Harvey J. Gibson, owner of the car, was killed and Collier badly injured. The verdict of the coroner in the Gibson case censured the town board and demanded that the highways be widened several feet for the protection of life and limb. Under the Wisconsin law, the town board cannot be held for damages to exceed $5,000. It is claimed Collier has an excellent case, especially through the coroner's investigation, and the Gibson estate also will file claim.

WILL ASK FOR GRADED FEES

Representative Ritter, chairman of the finance committee of the house of representatives of the Ohio legislature, is preparing a bill which he will ask the general assembly to enact into a law which provides for a graduation of registration fees for motor vehicles. The rough draft of his bill provides for $3 for all electric machines; $5 for all gasoline or steamer cars of 20 horsepower or under; $10 for all cars from 21 to 40 horsepower and $15 for all over 40 horsepower. All trucks are to be registered at $5. It is known that there will likely be twenty-five motor bills thrown into the hopper at the convening of the general assembly and friends of the motorists will unite on one and in that way fight for some fair measure. The state motor department is backing no legislation and the chief registrar believes the present law is sufficient. The state department gave the benefit of its experience to Representative Ritter while he drafted the bill. There is some doubt if a graduation of fees will stand the constitutionality tests of the courts, as the present law which was up in all the tribunals was declared not a license but only a police regulation. Now there is doubt if the graduation of fees will not bring it within the pale of licenses which are prohibited by the Ohio constitution.

NEW JERSEY LAW UPHELD

The supreme court has upheld the constitutionality of the amended New Jersey motor law in the test case begun by Richard H. Johnston, publicity manager of the White Co. Mr. Johnston started from New York in a car not registered and containing a quantity of tools which he claimed he was taking to Philadelphia, thereby giving color to the contention that he was engaged in interstate commerce. He was arrested in Trenton, and thereupon he began certiorari proceedings to determine the rights of motorists. The law was attacked on the grounds that it imposes a tax upon motor cars not based on their true status but upon their horsepower; that this is a double tax, the first tax being levied by the assessors of taxes; that motor cars are put in a special class for the purpose of taxation, from which class is excluded property similar in character; that the imposition is a state tax upon the business of interstate commerce, and so violative of the federal constitution, and lastly that the act requiring a non-resident to designate as agent upon whom process may be served in this state discriminates against citizens of other states. Justice Reed holds that the receipts from fees for registration and licenses do not so largely exceed the sum specifically charged for the maintenance of the motor car department that they are extortionate for regulative purposes. Therefore, he says, the court cannot hold that the fees are a tax. Conditions imposed upon non-residents are not held as unconstitutional, but are construed by the court briefly, thus:

> Assuming that the right to use the highways belongs to such non-resident owner, yet it is obviously not an absolute right. The stringent legislative restrictions that have received judicial approval exhibit the fact that the motor car is regarded as a dangerous engine if used otherwise than under the control provided for by the legislature. It is apparent that these restrictions upon the manner in which highways shall be used by motor cars can only be made effective by penalties, and the penalties can only be enforced by reaching the owners of such machines. A provision for impounding the machine itself would be valid, but while valid would be inefficacious because the speed of the motor car is such that in most instances the machine itself would escape arrest.
>
> Resident owners can be reached by service of process within this state, while non-resident owners, of course, unless by voluntary appearance, are immune from service. Thus while legal proceedings to enforce the penalties for violating the motor law can be taken in the courts of this state as against residents, yet as to non-residents, in the absence of a provision like the one in question, such enforcement would mean numerous suits in other states of the union from New York to California, or perhaps in other continents.
>
> In view of the present need of a vigorous enforcement of these laws by the protection of all other users of the highways I am of the opinion that the condition imposed that a man who proposes to use our highways for motoring shall agree to submit himself to the courts of the state into which he comes so far as concerns matters growing out of such use is neither unconstitutional nor unreasonable. In respect to the point that this burden is imposed upon non-residents and not upon residents and so unconstitutional inequality is created, it is sufficient to say that both residents and non-residents are placed upon the same footing. Both are amenable to the laws of the state whose highways they are using.

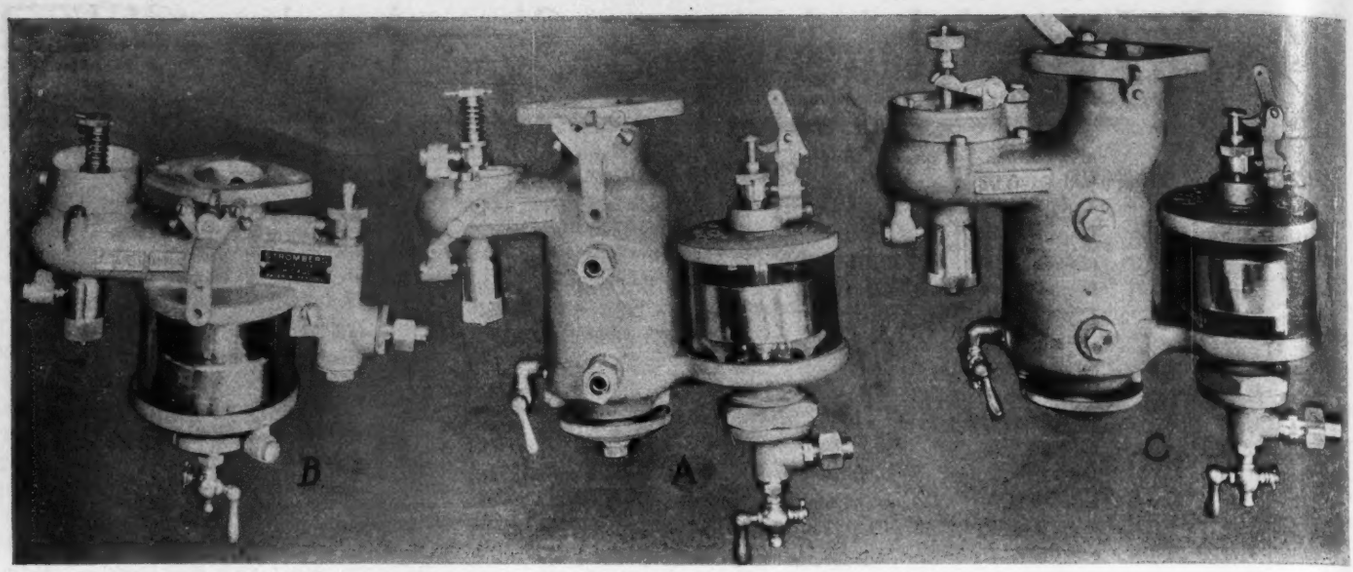


FIG. 1—THREE TYPES OF STROMBERG CARBURETERS FOR NEXT SEASON

STROMBERG DESIGNS AND CONSTRUCTIONS

By Thomas J. Fay

INTEREST in a device must be keen and the process of its manufacture should be well worth citing if the device has arisen out of the sea, as it were, and taken on the garb of importance within a short period of time. The Stromberg carbureter, made by the Stromberg Motor Devices Co., Chicago, represents much when the tale of accessories is to be told, and it bears evidence of a character such as will help motorists to appreciate the reason why makers of cars find it convenient to purchase accessories rather than to manufacture them.

The Stromberg carbureter is made in three models, and divers modifications are added, each to suit the car for which it is manufactured. The three types of carbureters are illustrated in Fig. 1, and it is there shown that there is a certain harmony of relation despite the fact that A represents a waterjacketed type; B is a concentric form, and C is a double-nozzle carbureter contrived in view of a certain service to be rendered. It has been found that no one carbureter can be so designed that will serve for all makes of motors without introducing complications and all that the word implies, and, too, in the face of the growing presentiment that simplicity is what is wanted in motor cars.

Different Types of Strombergs

If, in view of the characteristics of a given motor, the type A carbureter will do all that has to be accomplished, there is no sound reason for resorting to the use of a carbureter such as type C. The double-nozzle, as found in type C, although it is of the greatest importance under certain conditions, would be detrimental under the conditions indicating that the type A carbureter will suffice for the purpose.

In the manufacture of carbureters, then, the first requisite is to consider the nature of the service to be rendered, and to so design the device that it will serve for all requirements, and no more. It is just as much of a mistake to invent and add complications as it is to fall in the path of primitive simplicity. Many of the devices which found a resting place in cars of the past were so primitively simple as to be of small value in the light of present standards; even so, there are many failures to be charged to senseless complication, ofttimes the product of a designer whose excuse may have been centered in the desire to be different.

It is easily proven that complex carbureter designs grew out of racing conditions, in which flexibility was sacrificed to maximum speed, and so far was the influence for speed carried that it was not considered important if the carbureter was entirely incapable of delivering a mixture which would serve any good purpose at low speeds.

The pitfalls which beset the path of the pioneer designers of carbureters never will be told, nor is it a matter with which one now is concerned. The point here to be made is one involving the production in quantity of carbureters—taking into account the necessity of having every carbureter delivered as perfect as a chronometer, and this in the face of the vast quantity which is necesasry in order to apply a carbureter to the last one of the thousands of cars which are now being manufactured.

Fortunately quantity production, if it is properly organized, is a guarantee of accuracy of parts, and in order to reach the level of interchangeability it is necessary to eliminate the personal equation; this is assured by the use of dies, jigs, special tools and methods, all at the expence of skill on the part of the designer and at a cost far in excess of any figure likely to float from the tongue of a prophet.

The type of carbureter made in this plant is not so readily discerned by examination of Fig. 1, and in order to better understand the situation Fig. 3, which is a section of the type A carbureter, is offered to help understand the mechanisms of the waterjacketed product, and Fig. 4 shows the carbureter with the waterjacket eliminated, and the concentric relation of the floatbowl.

Principle the Same in All

Referring to Fig. 3 it will be observed that the nozzle N terminates in the region of the apex of a pair of inverted truncated cones, thus bringing the carbureter into the class employing the venturi-tube principle. Fig. 2 presents the venturi principle without the Stromberg modification, and the halves of the truncated cone are there more clearly shown. It has long been known that a spraying nozzle, if it is placed in the region of the apex of inverted truncated cones, in the manner as shown in Fig. 3, will perform its function, which is to deliver liquid fuel at a constant ratio, so that the amount of gasoline which will mingle with the air will be that which will produce a constant richness of the mixture under all conditions of service.

There are certain modifications of the principle to be tolerated, and in practice is not too much to expect that the richness of the mixture will be at some variance with the theory. In the Stromberg carbureter, for illustration, it was found permissible to depart from the true venturi —inverted cone—design and something of

a gain was experienced. The nozzle, in order to be able to remove it, is screwed into a nozzle tube N T, and this makes the diameter of the same somewhat more than might otherwise be required, with the result that the venturi tube walls have to be curved out in order to increase the area of passageway around the nozzle. Then the apex A, Fig. 2, is somewhat flattened for practical purposes, and by a series of impirical approximations the walls were shaped for the best results, but it was not found at any time that the true—unmodified—venturi tube would serve any better purpose. The cup B catches all excess gasoline, and as the air rushes by, passing close to the edges, it laps up this gasoline. This is a very desirable condition, not so much on the ground of economy, but for the reason that in priming when the gasoline trickles into the bowl the more volatile portion will be in sufficient quantities to render easy starting a reality. The time was when gasoline was so uniform in quality that this excess was not necessary, due to uniform volatility; now due to the lack of much of the volatile portion present, it is necessary, under certain conditions, to allow for an excess, rather with the expectation that enough of the hexane content present in the gasoline will be available for easy starting.

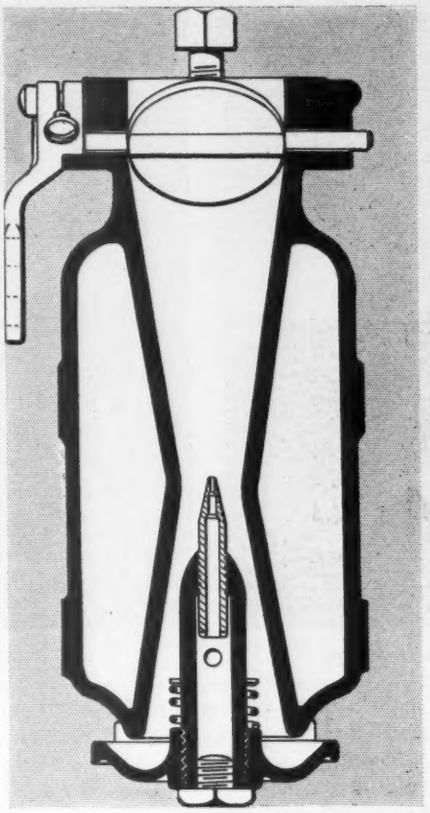


FIG. 2—THE VENTURI TUBE

In the venturi tube as shown in Fig. 2 no provision is made for auxiliary air, and the mixture is made by mingling the gasoline from the nozzle with the air that rushes by, a slight depression being formed by the suction of the motor at the apex of the tube, by means of which the gasoline is sucked out. In Fig. 3, however, an auxiliary valve admits fresh air as the occasion requires, so that if the mixture made by the gasoline and air at the apex of the tube be too rich it will be reduced to the proper proportion before entering the combustion chambers of the cylinders. In this case the modified venturi tube serves as a strangle passage and assures the desired richness of the mixture at low speeds of the motor; as the speed increases the auxiliary valve opens and the mixture is diluted as the speed increases to afford a constant richness of the mixture going to the motor.

The arrows are placed to show the direction of the air currents, and the throttle valve at the top is for the purpose of regulating the amount of mixture.

The gasoline enters from the tank, flowing through copper piping at G and passes up through the needle-valve hole H into the floatbowl, where it is regulated in the manner shown by the buoyancy of the float F. As the gasoline fills the bowl the float rises, but when it reaches a certain level the needle valve is forced down against its seat and no more gasoline is permitted to enter until the level is lowered by the delivery of gasoline to the motor. Weights, WW, connected to the needle valve in the bowl, add stability to the action, and the bowl, resting on the weights when the gasoline is low at the points RR, furnishes the force required to lift the valve and admit gasoline.

When it is desired to prime the motor the lever is available, and by pulling the same in the direction of the arrow the toe of the lever, which hooks under a button on the end of the needle valve, lifts the same against the pressure of a spiral spring S. The bowl is composed of a brass top and bottom part and walls of glass, made from a glass cylinder cut to the proper length and the ends are packed with cork packing rings. The glass tube enables the user to look and see if the gasoline is at the proper level or to note if any of the parts are awry. A draincock D at the under side of the bowl affords an easy means of draining the bowl, and water if it collects is thus drained away.

The auxiliary air valve is provided with a spring S1, the tension of which may be altered at will, and this spring

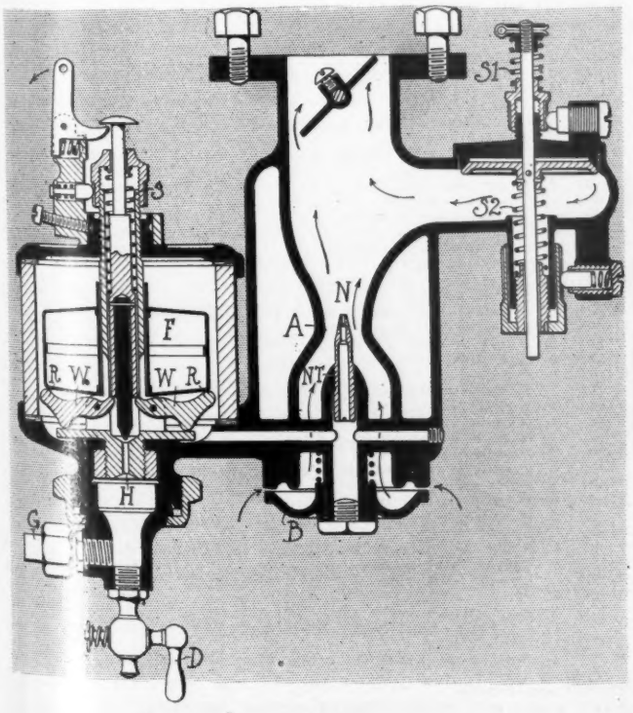


FIG. 3—STROMBERG WATERJACKETED CARBURETER

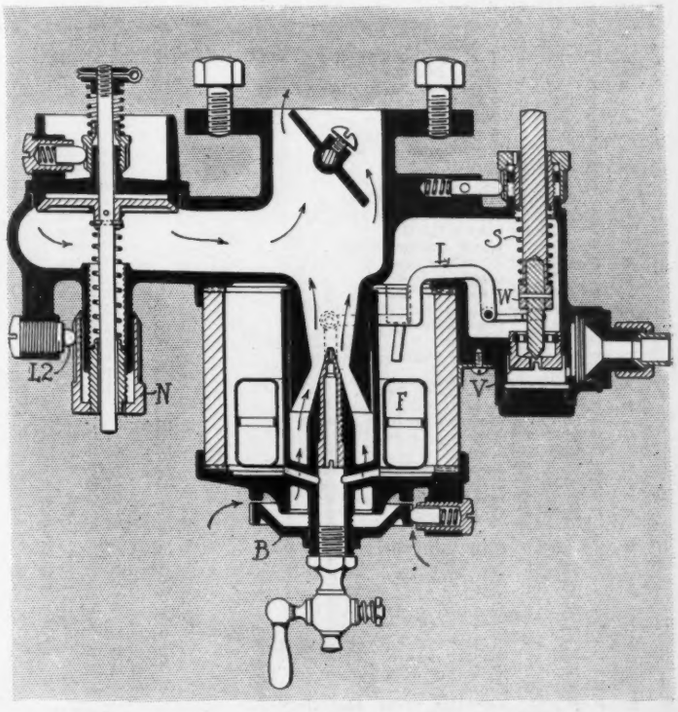


FIG. 4—THE STROMBERG CONCENTRIC-NOZZLE CARBURETER

FIG. 5—SAND BLASTING THE STROMBERG CARBURETER

FIG. 6—BUFFING AND GRINDING CARBURETER PARTS

regulates the extent of air dilution, since in opening the spring aids the suction of the motor to open the valve, increasing with the speed of the motor. Likewise the spring S2 presses against the auxiliary valve, helping to hold it closed against the suction of the motor, and since the two springs oppose each other the valve is delicately poised and the suction of the motor is therefore free to perform its automatic function untrammelled by inertia.

The type B carbureter, Fig. 4, unlike the type A, has the floatbowl below the valves and transfer ports, and the nozzle is concentric with the bowl. Then this type of carbureter is not waterjacketed, and there are other minor differences, among which a certain compactness may be noticed. In this carbureter the needle-valve V is off to one side and is actuated by the lever L, one end of which hitches under the washer W, and the same washer serves for a bearing for the spring S, placed to establish a firm seat of the needle. The lever L is curved up and around the glass bowl and is fastened to a bail which in turn is secured to the

SAMPLE OF STROMBERG STOCK LIST FOR ITS CARBURETERS

A—Individual parts
B—Partial assemblies
C—Blank parts and parts entering partial assembly

	Piece No.	Req.	Name	Material
A	P- 11	1	Round hd. mach. scr	Iron
A	P- 59	2	Hex. hd. mach. scr	Iron
A	P- 66	1	Upper air valve spring	Steel
A	P- 67	1	Upper air valve spring	Steel
A	P- 69	1	Upper adj. nut	Brass
A	P- 79	1	Cotter pin	Iron
A	P- 84	1	Top spring cap nut	Brass
A	P- 93	1	Lock plunger scr	Brass
A	P- 96	1	Gasoline spraying dome	Steel
A	P-109	2	Fillister hd. mach. scr	Iron
A	P-215	1	Fillister hd. mach. scr	Iron
A	P-272	1	Float lever scr	Brass
A	P-276	1	Lock plunger scr	Brass
A	P-277	1	Pin	Brass
A	P-286	1	Spiral spring	Bronze
A	P-288	1	Gasoline strainer	Brass
A	P-299	4	Round hd.. mach. scr	Brass
A	P-300	2	Name plate	Brass
A	P-407	1	Lock plunger scr	Brass
A	P-410	1	Throttle valve	Brass
A	P-461	1	Lock plunger	Brass
A	P-465	1	Hex. hd. scr. plug	Brass
A	P-487	1	Round hd. mach. scr	Brass
A	P-489	1	Indicator	Brass
A	P-506	2	Fillister hd. mach. scr	Iron
A	P-508	1	Float chamber bottom	Brass
A	P-509	1	Air cup	Brass
A	P-511	1	Air valve top	Brass
A	P-542	1	Drain cock	
A	P-609	1	Float chamber casing	Glass
A	P-610	2	Packing ring	Vulcabeston
A	P-622	2	Gasket	
A	P-693	1	Adj. nut lever	Brass
A	P-694	1	Lower air valve spring	Steel
A	P-695	1	Needle valve spring	Steel
A	P-721	1	Main body	Brass
B	P- 33	1	Adj. nut lock	
B	P- 65	1	Air valve	
B	P-152	1	Adj. nut lock	
B	P-242	1	Union	
B	P-245	1	Needle valve adj. nut	
B	P-298	1	Adj. nut lock	
B	P-460	1	Needle valve seat	
B	P-468	1	Needle valve	
B	P-500	1	Priming attachment	
B	P-700	1	Float	
B	P-742	1	Throttle lever and stem	

	Piece No.	Req.	Name	Material
B	P-705	1	Float lever	
B	P-720	1	Lower adj. nut	
C	P- 20	1	Esc. pin	Brass
C	P- 38	2	Pin	Brass
C	P- 40	2	Pin	Steel
C	P- 41	1	Union nut	Brass
C	P- 43	1	Union solder nipple	Brass
C	P- 45	1	Pin	Steel
C	P- 49	1	Spiral spring	Bronze
C	P- 63	1	Air valve stem	Bess. rod
C	P- 74	1	Air valve disc	Brass
C	P- 76	1	Throttle lever stem	Bess. rod
C	P- 82	1	Spiral spring	Bronze
C	P- 87	2	Lock plunger	Brass
C	P-676	1	Throttle lever	Brass
C	P-241	1	Union long nipple	Brass
C	P-243	1	Adj. nut shell	Brass
C	P-244	1	Adj. nut center-piece	Brass
C	P-274	1	Lock plunger	Brass
C	P-281	2	Float lever pin	Brass
C	P-283	1	Spiral spring	Bronze
C	P-284	2	Fillister hd. mach. scr	Iron
C	P-285	2	Fillister hd. mach. scr	Iron
C	P-291	2	Float hanger	Brass
C	P-292	2	Esc. pin	Brass
C	P-297	1	Pin	Bess. rod
C	P-462	1	Needle valve guide	Brass
C	P-463	1	Needle valve seat shell	Brass
C	P-464	1	Needle valve point	Nickel
C	P-466	1	Needle valve stem	Brass
C	P-498	1	Priming plunger	Brass
C	P-499	1	Priming attachment frame	Brass
C	P-501	1	Priming lever	Brass
C	P-502	1	Priming attachment base	Brass
C	P-503	1	Priming plunger cross-pc	Brass
C	P-505	1	Spiral spring	Steel
C	P-535	1	Float lever fork	Brass
C	P-698	1	Upper float-piece	Brass
C	P-699	1	Lower float-piece	Brass
C	P-504	1	Pin	Brass
C	P-718	1	Adj. nut center-piece	Brass
C	P-719	1	Adj. nut shell	Brass

Note

A P-721 1 Main body made from blank of P-510.... Brass

A—Individual parts
B—Partial assemblies
C—Blank parts and parts entering partial assembly

TABLE SHOWING STROMBERG SYSTEM FOR RECORDING CARBURETER SIZES

CARBURETER Draw. No.	Type and No.	Carb. Size	Name	USED FOR Year	Model	H.P.
A- 41	A. No. 1	1	Standard			
A- 42	A. No. 2	1¼	Standard			
A- 43	A. No. 3	1½	Standard			
A- 44	A. No. 4	1¾	Standard			
A- 45	A. No. 5	2	Standard			
A- 47	A. No. 7	2½	Standard			
A- 51	B. No. 1	½	Standard			
A- 52	B. No. 2	¾	Standard			
A- 53	B. No. 3	1	Standard			
A- 54	B. No. 4	1¼	Standard			
A- 55	B. No. 5	1½	Standard			
A- 57	B. No. 7	2	Standard			
A-102	C. No. 2	1¼	Standard			
A-103	C. No. 3	1½	Standard			
A-104	C. No. 4	1¾	Standard			
A-105	C. No. 5	2	Standard			
A- 42	A. No. 2	1¼	Apperson	1909	O	30
A- 42	A. No. 2	1¼	Apperson	1909	M	40
A-103	C. No. 3	1½	Austin	1909	45	45-50
A-105	C. No. 5	2	Austin	1909	60	60-90
A-164	B.X. No. 4	1¼	Autocar	1909	20	30
A-241	A.R. No. 1	1	Benz	1910	18	18
A-242	A.R. No. 2	1¼	Benz	1910	28	28
A-243	A.R. No. 3	1½	Benz	1910	40	48
A- 54	B. No. 4	1¼	Cino	1910	10	30
A-182	A.X. No. 2	1¼	Dorris	1910	E	30
A- 54	B. No. 4	1¼	Falcar	1910	M	35-40
A-304	B.T. No. 4	1¼	Haynes	1910	19	30
A- 55	B. No. 5	1½	Inter-State	1910		35-40

CARBURETER Draw. No.	Type and No.	Carb. Size	Name	USED FOR Year	Model	H.P.
A-114	B.Y. No. 4	1¼	Kisselkar	1910	L.D.-10	30
A-262	A.P. No. 2	1¼	Kisselkar	1910	D.-10	40
A-263	A.P. No. 3	1½	Kisselkar	1910	F.-10	50
A-103	C. No. 3	1½	Kisselkar	1910	G.-10	60
A-123	A.U. No. 3	1½	Knox	1909	O	38
A-194	B.V. No. 4	1¼	Marion	1909	Willys Six 34	45
A-213	C.Y. No. 3	1½	Matheson	1910	M	50
A-132	A.W. No. 2	1¼	Moon	1910	45	45
A-235	B.W. No. 5	1½	Mora	1910	Light 4	35-40
A-194	B.V. No. 4	1¼	Overland	1909	Willys Six 34	45
A- 54	B. No. 4	1¼	Pierce	1910	K	30
A-142	A.Y. No. 2	1¼	Premier	1909	Tour. Clubman	30
A-143	A.Y. No. 3	1½	Premier	1909	Tour. Clubman	45
A-294	B.U. No. 4	1¼	Reo	1910	Four	30
A- 54	B. No. 4	1¼	Ricketts	1910	10	35-40
A-252	A.Q. No. 2	1¼	Rider-Lewis	1910	10	30
A-173	A.S. No. 3	1½	Selden	1910	35-T, 35-R, 35-P	36
A-173	A.S. No. 3	1½	Selden	1910	29-L	40
A-222	S.D. No. 2	1¼	Stod.-Dayton	1910	10-A	40
A-222	S.D. No. 2	1¼	Stod.-Dayton	1910	10-H	30
A-223	S.D. No. 3	1½	Stod.-Dayton	1910	10-F	50
A-224	S.D. No. 4	1¾	Stod.-Dayton	1909	9-S	60
A-272	A.O. No. 2	1¼	Thomas	1910	R	28
A-283	C.X. No. 3	1½	Thomas	1910	M	40
A-202	A.T. No. 2	1¼	White	1910	G.A.R.	20
A-151	A.V. No. 1	1	Pullman	1909	L	20
A-152	A.V. No. 2	1¼	Pullman	1909	K	30
A-153	A.V. No. 3	1½	Pullman	1909	440	40

float at two diametrically opposite points.

The strangle tube in this type also is of the modified venturi shape and the cup B at the bottom is adjustable so that the depression in the chamber may be regulated at will, to suit the characteristics of the given motor. In all models of carbureters of this make adjustment of spring tension is brought about by turning knurled adjusting nuts, as at N, and by means of a locking pin L2 which engages slots milled in the nuts the adjustment is rendered permanent.

Drawings an Important Factor

Since most of the material used in these carbureters is cast brass, the first requisite is by way of suitable drawings, one of which, as a characteristic example, is offered in Fig. 7. This drawing shows the main body for the type A—No. 2—carbureter, with all dimensions both for the pattern and in the process of machining. At first glance it would seem like a loss of effort to discuss this phase of the problem, and yet if the future is to be taken into account it does seem as if a full record of every part made and used should be from a definite drawing, especially as repair parts will only fit if they are accurately made, and this would be an utter impossibility in the absence of accurate drawings and suitable specifications.

Foreseeing possible complication the maker elaborated a complete system under which all carbureters were made, and the specifications, as sheet No. 1, will offer evidence of the careful manner of recording all the activities of the company. The working drawing, Fig. 7, will be found recorded in the specifications as drawing No. A-142, type A, Y., No. 2, size 1¼, suitable on a Premier, made in 1909, known as a touring clubman, and the motor is rated at 30-horsepower. In the same careful manner all the carbureters are listed and recorded, so that a repeat order or repair parts may be had quickly and to size if the order is properly made out and reaches the sales office of the company.

In addition to the record sheet for each type of carbureter made a stock list is compiled, as here shown in the tabulation above in which the parts required are listed, and the material of which they are made is stated. This stock list is rendered clear by a system of lettering, as A represents individual dual parts; B, partial assemblies, and C stands for blanks and parts entering assemblies. By means of these stock lists, the record sheets, and a drawing of every part used in every carbureter made, it is quite plain to be seen that the process of manufacture is definite, and a proper record is available, it being really made before the work is done.

With complete drawings to guide the progress of the workman the pattern work is then done in the same shop, and after the patterns are checked they are sent to the foundry and the real manufacture of carbureters begins. If the parts—owing to shape—will not make their own core, so to speak, cores have to be made and baked before the moulder will be able to shape the molds. Small parts, especially in shapes that form their own cores or in which core work is not present are gated in order to reduce cost.

Care Necessary in Foundry Process

The metal in order to be dense, of a uniform color, sufficiently fluid to run well and free from the characteristics which are so prone to produce wasters, is charged in the crucible pots or other suitable furnaces, using proper proportions, and with the molds prepared in the meantime, the metal is teemed at the right temperature,

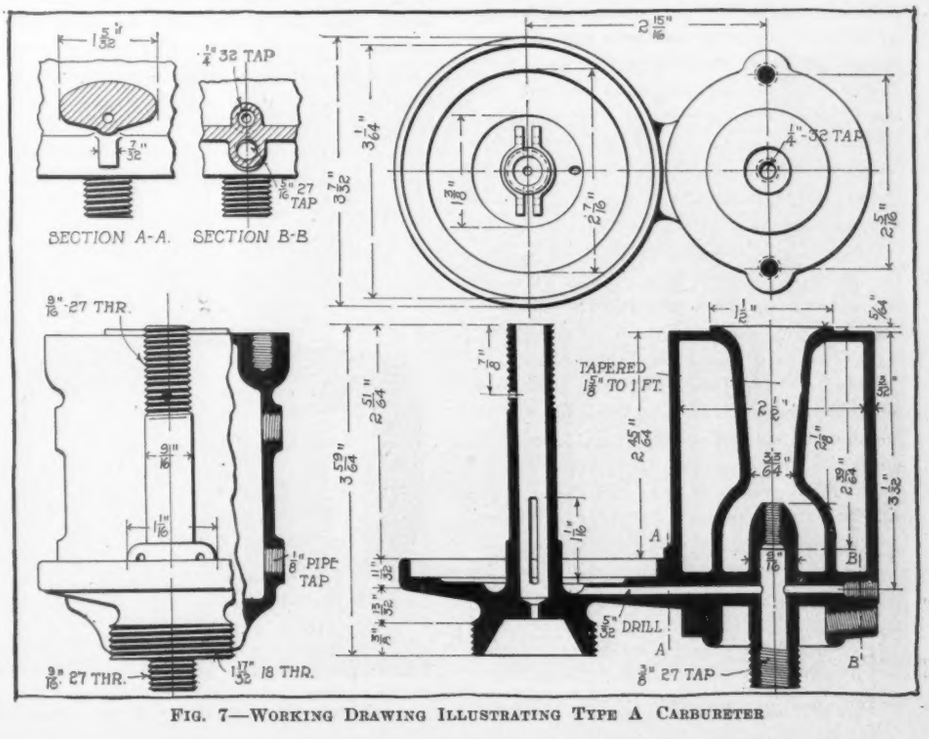


FIG. 7—WORKING DRAWING ILLUSTRATING TYPE A CARBURETER

FIG. 8—TURRET-LATHE OPERATIONS ON BODY OF CARBURETER

FIG. 9—ANOTHER TURRET-LATHE, WITH HYDRAULIC CHUCK

which is a matter involving skill and judgment. The foundry process is of more than ordinary importance in the manufacture of carbureters, in view of the intricate core work involved, and due to the nicety with which the parts have to be machined if the results are to be up to a fitting standard.

Most Castings of Brass

The castings, nearly all of brass, when they come from the foundry have to be prepared for the sand blast by chiseling off all fins and other irregularities, and in most cases they have to go to the grinding department, where they are further prepared, in the manner shown in Fig. 6, in which irregularities are ground off by the grinder G, and the surfaces are given a rough polish at the buffer B. As a rule, however, it is not necessary to buff the castings before they go to the sandblast so that the grinder suffices for the preliminary operation.

The castings, especially the waterjacketed type, having cores, are placed in the sand stream as it issues from the nozzle of the sand blast hose, Fig. 6, and all sand is cleaned out. Then the exterior surfaces are blasted, reducing them to an even, regular surface, having the appearance of a frosted finish. If this is to be the final finish nothing more has to be done unless to lacquer the surfaces at the right time, following the usual preparation involving the removal of grease so that the shellac will adhere to the surfaces. If a bright finish is to be final it is most readily secured after sand blasting, and all that remains is to buff the parts at the propitious time and lacquer is then applied to render the bright work more permanent.

The parts, in view of the accuracy required and on account of the intricate shapes, are machined in various ways, as on turret lathes, with jigs, and other devices of convenience, specially contrived to aid in the process and assure accuracy. As a concrete illustration of the methods employed reference may be had to Fig. 8 of the turret lathe, and the body B of a carbureter is held in the fixture F, which is so made that the body may be quickly put in, and it is so self-centering that the workman is not required to exercise more than nominal skill. When the part is in place the workman by means of the shifting lever starts the lathe and with the right hand manipulating the turret lever L2 he is enabled to quickly bring into range any of the several tools held in head, thus doing the several operations accurately and with consummate deftness.

In many of the operations, owing to the delicacy of the work, watchmakers' lathes are used, and a complete exposition would disclose a wide range of the machine tools used in this work. One of the most interesting tools employed is shown in Fig. 9, which represents a lathe fitted with a hydraulic chuck C1, controlled by means of the valve V, with a turret T, and tools of the required shapes, A, B, C, etc., around the turret. When the workman desires to chuck or remove work from the tool it is not necessary to stop the tool; all that he has to do is to manipulate the chuck jaws by operating the valve V and insert or remove the work with the free hand. This tool lends itself to this class of work and speed and accuracy are realized to a maximum degree.

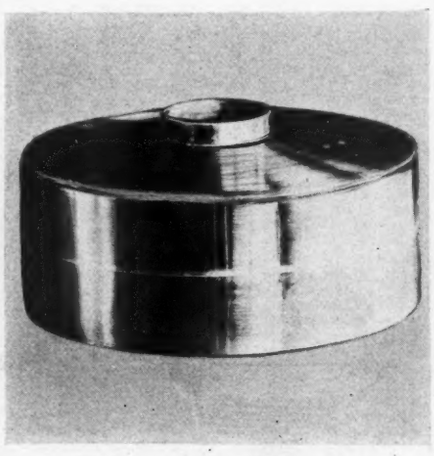


FIG. 10—THE FLOAT BOWL

Despite the masterly way in which the machining is done, using machine tools of the most ingenious order in the process and a wide variety of jigs and fixtures, there is a considerable amount of hand work to be done, and skilled bench men are employed for this purpose. The float bowls, Fig. 10, for illustration, have to be soldered; they are first spun in halves, and besides being telescoped together are soldered, and while this operation is being done the workman must drive out the atmospheric air from the bowl, which he does by heating, and then closes up the vent with a drop of solder.

After machining, all the parts are collected, inspected and assembled. Then, before being delivered to stock, they are subjected to a series of tests to determine their capabilities. The first test, Fig. 11, is made to determine if the bowls are gasoline-tight and if the floats are not only tight but of the required weight, properly adjusted, and in the right relation to the nozzle. This is accomplished by placing the carbureter in position, connecting the gasoline pipe, and with gasoline in the tank T, open the valve V and allowing gasoline to enter the carbureter until it is arrested in its flow by the action of the

float does its part and the valve seats to absolute tightness, the next operation is to observe the height of the gasoline in the nozzle; under most conditions the gasoline raises to within $\frac{3}{16}$ inch of the top of the nozzle.

The gasoline tank is elevated enough to afford a suitable pressure to develop any flaws that may reside in the metal of the float bowl, and the workman who is entrusted with this class of work must earn his promotion by showing keen perception in many respects for a sufficient length of time to grow a reserve of confidence in the mind of the proper authority. If the bowl is tight and the adjustments seem to be right, the carbureters so tested are then sent to the running test room for the final test.

Final Test of Carbureter

In the final test every carbureter is connected up to the motor, Fig. 12, and given a running test under several conditions of load. The electro-dynamometer E, at the far end of the motor, is capable of affording a full load for the motor, which is of the six-cylinder type, and the carbureter C is subjected to a variety of exacting conditions, which must be fairly met before carbureters are allowed to go to stock.

OLYMPIA SHOW OPENS

(Continued from Page 11)

the center of gravity of the car and give practically a straight-line drive effect. This motor has the cylinders in pairs with valves on one side and uses the conventional transverse shaft in front for driving the magneto at one end and the water pump at the other. The distributor is mounted on a short vertical shaft driven from this transverse one. This motor has a well-worked out lubricating system in

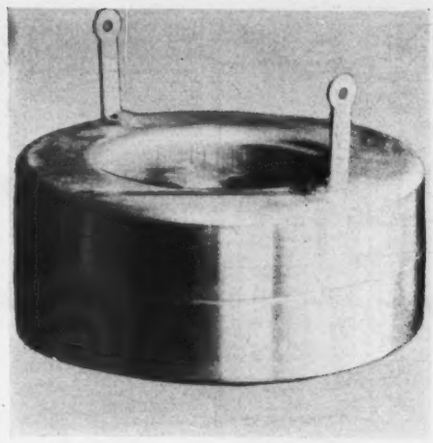


FIG. 10—STROMBERG CONCENTRIC FLOAT

which an oil pump is incorporated in the lower half of the crankcase. Instead of using external pipes coreways are formed in the casting through which the oil is carried to the crankshaft bearings, as well as to points where it is directed upon the connecting rod bearings. Oil baffle plates are fitted into the openings of the cylinders to prevent an excess being splashed onto the cylinder walls. The crankcase housing is also cored to lead oil to the timing gear housing at the forward end.

The 7-horsepower Austin with its single-cylinder motor is a typical example of the British small-car which has been brought uptodate even to the extent of fitting three-quarter elliptic springs in the rear and using the magneto for ignition purposes. The motor has a 4 8-10-inch bore and 5-inch stroke and gives 9.5 horsepower at 1,350 revolutions and 12 horsepower at 1,800. It employs a three-speed gearset operating selectively and has all brakes located on the rear wheels. The forward axle is an I-beam section. A novelty is carrying the gasoline tank on the dash. This car on official test has traveled 37 miles to the gallon over ordinary roads. It is fitted with a two seated runabout body which has a very heavily-hooded dash and high doors, so that the driver is entirely protected from the weather.

NEW DETROIT CONCERNS

Detroit, Mich., Nov. 22—One of the new Detroit concerns is the Warren Motor Car Co., with a capital stock of $100,000, which concern will manufacture the four-cylinder Warren-Detroit car at its new plant, Isabella and Michigan avenues. The Warren-Detroit is rated at 24-26 horsepower with cylinders 4 by 4½-inch cast en bloc, the valves all on one side. The features of the motor are positive circulation, dual ignition, cone clutch, selective gear-set, 110-inch wheel base, and 32 by 3½-inch tires. Homer Warren, who heads the organization, is a business man of the aggressive type, and associated with him are C. Haines Wilson, J. G. Bayeline, who is vice-president and general manager, and R. W. Allen, secretary. W. H. Radford is the engineer and designer.

Another new Detroit product is the Krit car, manufactured by the Krit Motor Car Co., with a $100,000 capitalization. The first Krit model, which made its appearance recently, shows this new vehicle to be of the four-cylinder roadster type with cylinders cast en bloc, and the motor and selective gearset is a unit, with the important shafts each carried on ball bearings. A multiple-disk clutch is interposed between the two. Three-point suspension is used. Other features of this car are two sets of internal brakes, Bosch ignition, and I-beam front axle. The company's intention is to build 1,000 cars, beginning deliveries January 1. The company's officers include Claude S. Briggs, president; W. S. Piggins, secretary; B. C. Laughlin, treasurer; and Kenneth Crittenden, designer.

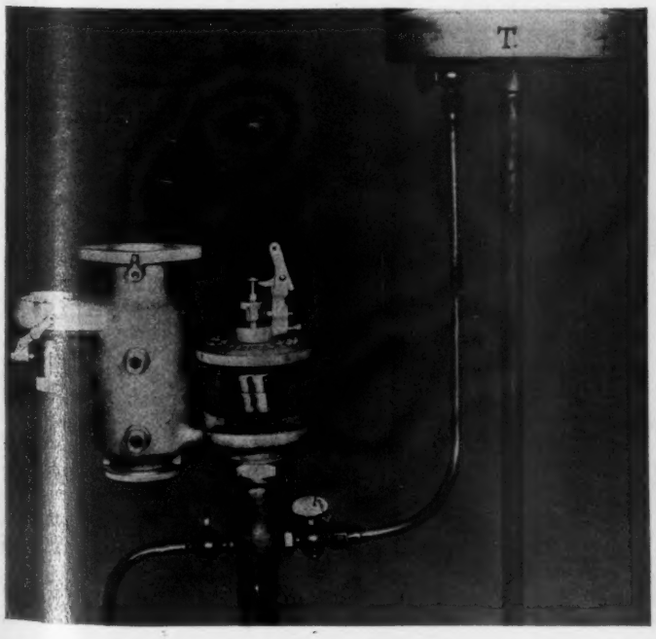


FIG. 11—TESTING THE FLOATS, FLOAT-CHAMBERS AND ADJUSTMENT

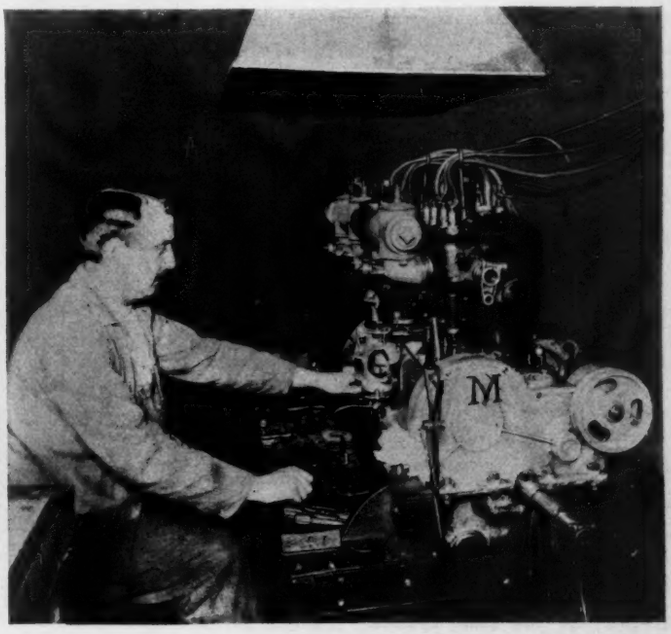


FIG. 12—FINAL TEST, ON SIX-CYLINDER MOTOR WHILE RUNNING

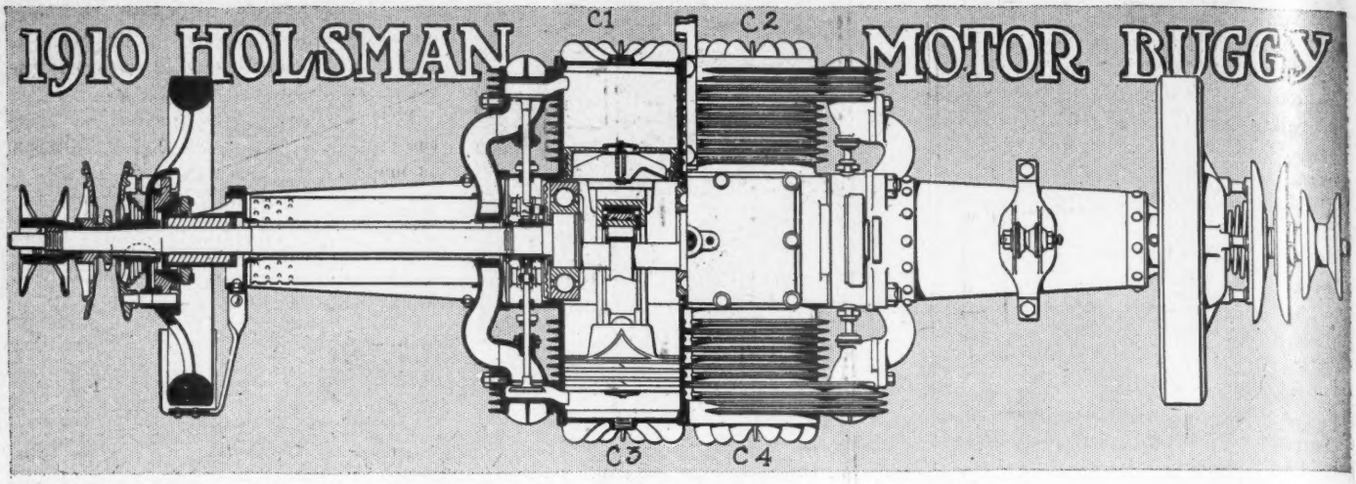


FIG. 1—THE FOUR-CYLINDER MOTOR USED IN HOLSMAN MOTOR BUGGIES

CHARACTERISTIC of the Holsman line of motor buggies is the coupe, Fig. 9, of which the inside control type, thus assuring to doctors and business men generally, a class of car that is fit for winter service, and holds the dual title to distinction, that is, the occupants are protected from inclemency of weather, and the road condition is a matter of small concern. This car is of the side-chain drive type, but it differs from cars in general in this class to the extent that the motor is swung under the body and power is transmitted directly to the rear road wheels by means of shieves, one of which —the larger—is secured to the wheel on each side; and the other is placed on the extension on each side of the crankshaft of the motor. This form of construction eliminates the transmission gear and differential; offers certain features that have proven out in practice, and permits of the use of a special form of motor, with four cylinders, a surfeit of power, and substantial evidence of simplicity.

In addition to the coupe there is a type of vehicle for two passengers with an open body and also a surrey. Besides these rigs, as used in pleasure pursuits, by professional men and in business, there is a line of commercial cars, among which is the delivery wagon, Fig. 8. In practice, there is almost no limit to the possible diversion by way of bodies if time and inclination are favorable, because the plan of the Holsman lends itself to body modifications almost without limit.

The power plant consists of a motor, Fig. 1, which is of the four-cylinder type, although the same idea is exemplified in a two-cylinder motor. The four cylinders, C1, C2, C3 and C4, are of the air-cooled genera, placed in the horizontal, two in tandem and a pair side by side. The two pistons, for each tandem set, are rigidly connected as shown in Fig. 2, in which P1 and P2 are the pistons, with P1 in section to expose the inlet valve V in the head of each piston, and to disclose the style of design, detail of piston rings R1, for each piston. In the same drawing the crankshaft C shows in section, and the annular ball bearing that takes the thrust of the crankshaft, as interpreted by the crankpin, has its outer race O embraced by rocker shoes S1 and S2, and the inner race I is concentric with the crankpin, of which there is one for each pair of cylinders in tandem.

The Holsman Crankshaft

The rocker shoes S1 and S2 are faced off and ground where the bearings engage, but they are as segments of a gear on the periphery, with involute teeth T1, engaged on the pitch line, with teeth T2 on a rack of hardened steel, which, in turn, is secured to the pistons. The crankshaft as illustrated in Fig. 5, is of special steel machined to near size and then ground to within .0003 inch where the bearings fit, and the throws K1 and K2 are fashioned much as eccentrics rather than as throws as the word implies in crankshaft work in general. Main bearings are placed over the enlargements at M1, M2 and M3, they being of the roller type, and the driving shieve is keyed on, by means of Woodruff keys, at W1 and W2, where the shaft is tapered to the Morse standard, and ground closely to size. The reverse shieves fit on the crankshaft at R1 and R2, and the threads cut on the shaft at the several points as indicated, are special, of a pitch and shape that experience dictates as best.

Since the motor is swung under the chassis and the shieves register with the driven shieves on the rear road wheels, it follows that the length of the crankshaft must be governed by the chassis requirements, and it is convenient to use two flywheels which are keyed on at F1 and F2, Fig. 5. Obviously, the motor may be cranked from either side of the car, and the details of the transmission are such that it is necessary to have the exhaust pass out through a pair of mufflers—on the four-cylinder motor—placed concentric with the crankshaft extension. In the two-cylinder motor there is but one muffler, placed concentric, at one side with the crankshaft.

Attaining Different Speeds

Referring to Fig. 3, it will be observed that the muffler M extends out from the body of the motor to the flywheel F, and the shieve mechanism, by means of which the transmission is consummated, is outside of the flywheel—on each side of the car—comprising S1 and S2, as adjustable shieve members for the high-speed ahead, and a fixed shieve S3, which engages the tire T of the rear road wheel, on each side, when it is desired to go in reverse.

In order to be able to drop into low speed, which is a matter of spreading the shieves S1 and S2 through a lever control

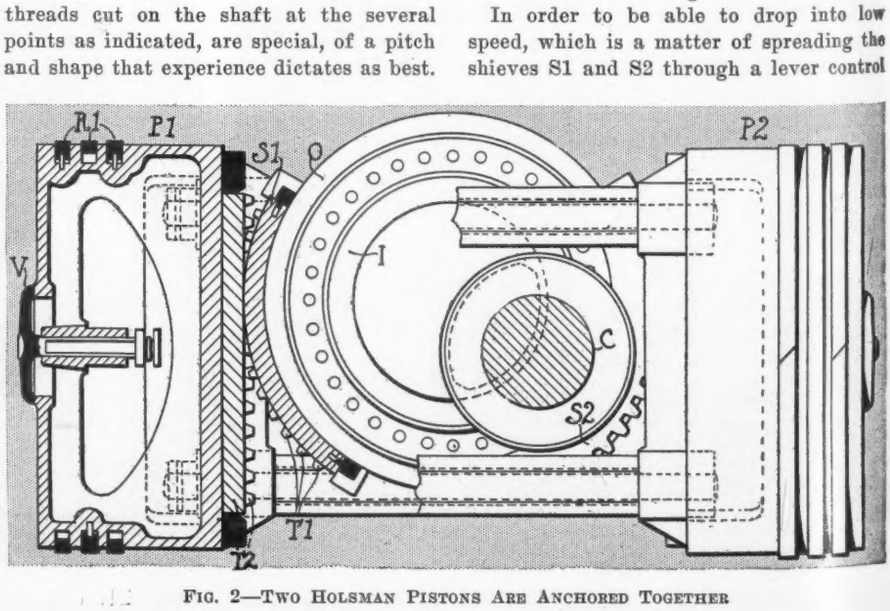


FIG. 2—TWO HOLSMAN PISTONS ARE ANCHORED TOGETHER

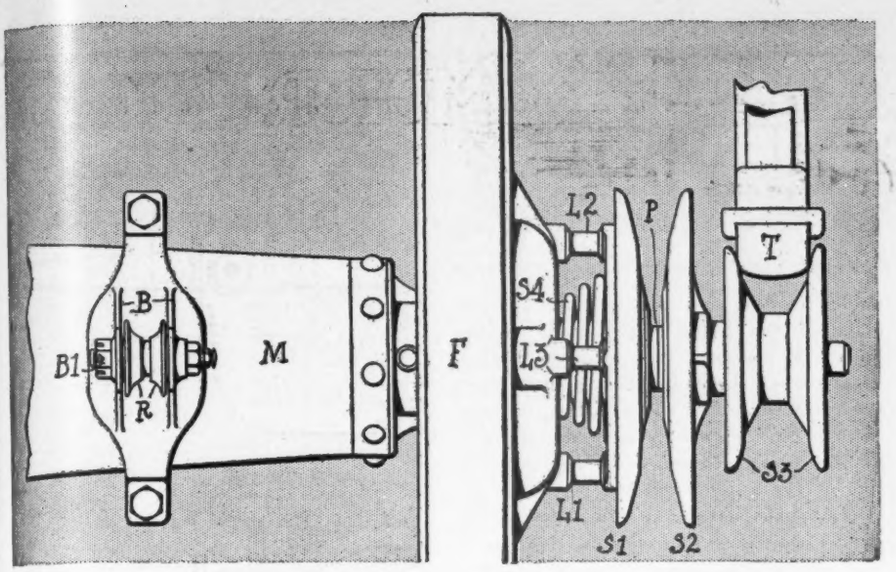


FIG. 3—DRIVING SHIEVES ON HOLSMAN MOTOR BUGGIES

system, the motor must be shifted sufficiently to tighten the sprocket chains when they engage the small sprocket pinion P which is keyed on the shaft between the shieve members S1 and S2. In going into reverse the motor must be shifted on its guides attached to it and the chassis, in the reverse direction to that required to drop into low speed, and the roller R, fastened to the motor by brackets B, at each side of the motor, rolls on the bolt B1, engaging a circular track, and enables the motor to be adjusted for whatever position may be demanded in view of the desired tension on the side chains for the respective drives.

The shieve S2, for the high speed ahead is pressed into intimate relation by means of the spring S4, and when the shieve members are properly engaged, during the high-speed period, locking bolts L1, L2, L3, etc., fall into registering holes, and the shieve is positively locked. The faces of the shieve members S1 and S2 are backed off to an angle of 15 degrees, and the sprocket chain, a section of which is given in Fig. 4, also is shaped to engage at this angle. In this chain the links are not unlike those in sprocket chains in general, excepting that the driving angle, when the chain engages the members of the shieves, are made by bulging the links out to the desired angle on the driving faces F. The rollers R and the rivets R1 conform to general practice, and when the transmission is in low gear, the chain works on the driving sprocket just as in the conventional way.

Power Plant Is Self-Contained

The power plant being self-contained, and the drive being entirely independent of the body, it follows that by having one extra power plant for a plurality of cars in service, the whole number of cars can be maintained at work, since if a power plant requires attention for any reason all that has to be done is to drop the plant down and place the extra in its stead; to repair the disabled plant at leisure is the remaining duty.

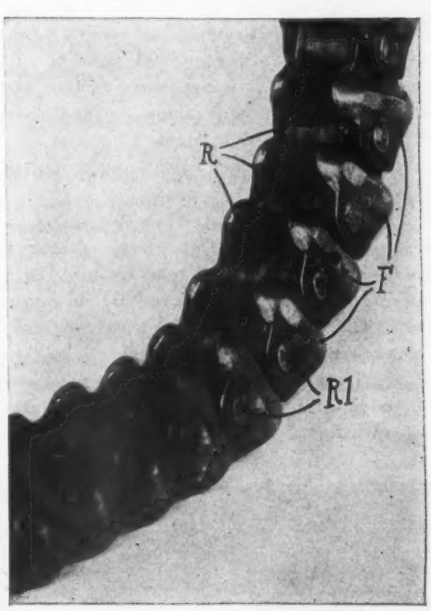


FIG. 4—SPROCKET CHAIN

With whatever space remains it will be the purpose here to show that the chassis, as made in the Holsman plant, is not, in any sense a compromise, but conforms to all the ideas of the designer, quite independently of any precedent that horse-drawn vehicles may appear to have suggested. Fig. 6 illustrates the rear axle of square section, forged in the Holsman plant from a special grade of steel, and like the front axle as shown in Fig. 7 is made in special dies from factory designs. In Fig. 8 it will be observed that the hub spindle S is longer than usual in vehicles in general, the Timken roller bearings are fitted over the tapered portions at T1 and T2. The radius rods engage at R, one on each side, and hardened bolts of liberal diameter, considering the service, are used for security purposes at these points. The rear axle is 1½ inches square and the gather is made to gauge; this being a matter of more than a little importance.

The front axle is illustrated in two views, Fig. 7, A is looking at the axle from the front while B is looking down on the same. The Elliott type of knuckles E are made in Holsman dies from special steel, and a bushing B, of bronze, concentric with the pivot bolt P, spans the entire distance between the bronze washers W1 and W2. The pivot bolt P has a head H, drilled out to accommodate a grease cup G, and at the lower end the bolt is threaded T, through the engaging member on the axle, and a nut N is placed for security; this nut is locked on by a cotter pin through the hole C.

Steering Arms Integral

The arms, connection with the steering linkages, are integral with the knuckle, and the drag rod engages with the large-diameter ball S, which is pressed in and riveted over in the boss on the end of the arm A. In part the cross link is made of a cold drawn steel tube of good thickness of wall, and the socket forging F1, is of a fine grade of steel, brazed after being pinned and is hardened and ground, just as is the ball.

The front axle, like the rear, is square, the gather is likewise to gauge, and the

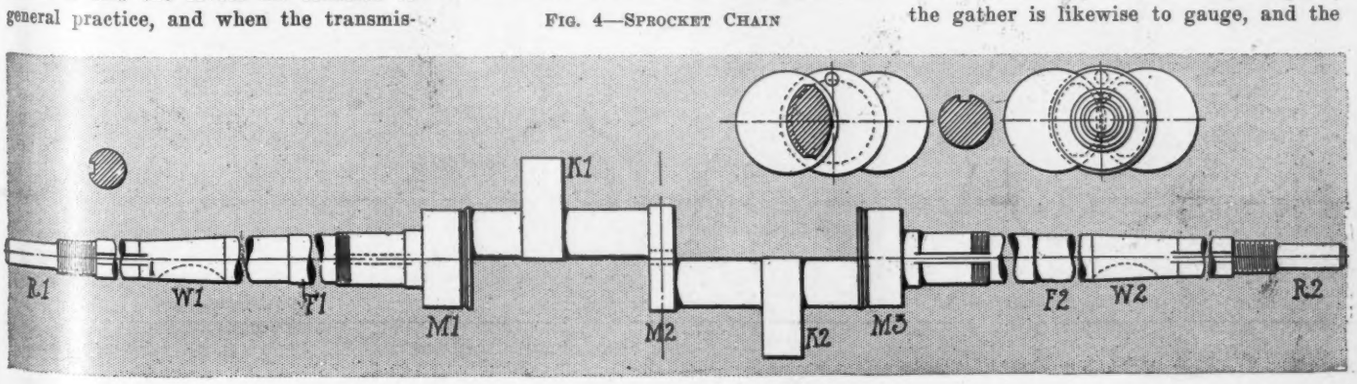


FIG. 5—THE HOLSMAN CRANKSHAFT FOR ITS FOUR-CYLIINDER MOTOR BUGGY

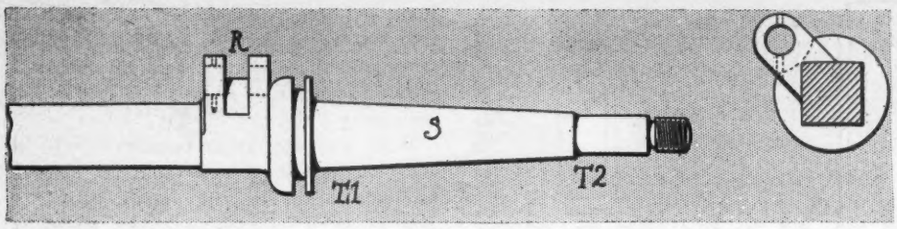


FIG. 6—HOLSMAN REAR AXLE END

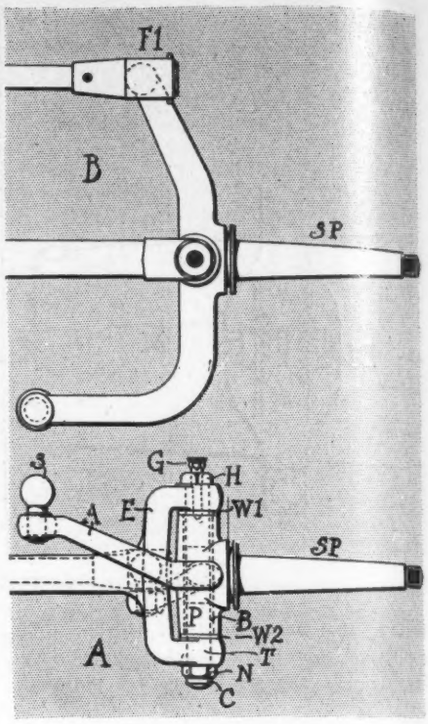


FIG. 7—HOLSMAN FRONT AXLE END

spindles SP for the wheels, also are tapered and ground to accommodate Timken roller bearings. The workmanship on the axles is up to standard, with limits of tolerance such as defeat any noise due to rattling of engaging related members, while buffer springs, placed back of balls in the sockets, not only abort shock, but scatter noise tendencies as well.

Wheels, as used in the Holsman, are designed for strength and resilience, and hubs, as presented in Fig. 11 being chosen, the one or the other, depending upon the service to be rendered, or the preferences of the trade. Referring again to the figure, A is a Sweet pattern; B is a Jessup; C is a Sarven in section, and D presents the exterior of the same type of hub; the spokes removed and depth of flanging showing. The Jessup differs but slightly from the Sweet pattern of hub, both being of excellent characteristics for this class of work, but the Jessup hub, owing to the use of a metal collar M is rather stronger, perhaps, although the difference is not so great as to preclude the use of the other type of hub. In this connection it might be well to state that the Sarven type of hub is much used in delivery wagon service and some wagon masters give it preference over other types.

Resilience of the Spokes

It is in the spokes, for the most part, that Holsman relies for the excess measure of resilience required when solid tires are used, and they are relatively long, shaped much as an aborigine would shape a bow, and are from selected second-growth hickory. The wheels are dished, that is to say, the spokes do not leave the hubs at right angles to the axis of rotation, but the plane of the felloe falls outside of the line of the center of the spokes where they depart from the hub. This dished form, since it gives to the spokes a length greater than the distance between the hub and the felloe, an amount equal to the verse sine of the angle from the perpendicular of the spokes, absolutely eliminates all but strut moments in the spokes, and, as is well appreciated, wood in compression is at its best; all the spokes act in unison, under this plan, and great strength is realized, although each spoke may be slender, hence resilient.

Uses Dished Wheels

This dishing throws the spokes out of the perpendicular, and in order to counteract the ills, such as they are, the axle is set in, and the amount of the set is that which will bring the load on plumb spokes. To accomplish this, the wheels tread closer at the point of road contact than the distance between centers at the top—diametrically opposite—and the spokes form, with the axle, an angle of 90 degrees. To accomplish this, it is necessary to bow the axle, so that it will slope toward each wheel the required amount, which for plumb spokes is equal to the angle of dish of the spokes.

The dished wheels, if they are set in to ride on plumb spokes, also have to take a gather or else they will tend to describe a curved orbit instead of traveling in a tangent. The amount of the gather, which is represented in having the wheels toe in at the front, is determined by the amount of the set. In high-wheel work this careful adjustment of the plane of the wheels is of far greater importance than in motor cars in general.

Steering, under conditions of proper set and gather of the wheels, is far more stable, and with the steering gear as shown in Fig. 10, Holsman motor types may be controlled from either side of the driver's seat, since the tiller T may be rotated 180 degrees with the column C, which is placed on the center line of the car. In this plan as it is worked out, the steering effort is natural, whether the driver sits on the right or the left-hand side of the seat; to turn to the right, press the tiller in the same direction, and vice versa. The knob K on the end of the tiller T, may be rotated, bringing the finger key K1 into the right relation, with the knob nested in the palm of the hand. This system of locking the steering gear is simple and effective, and when the driver

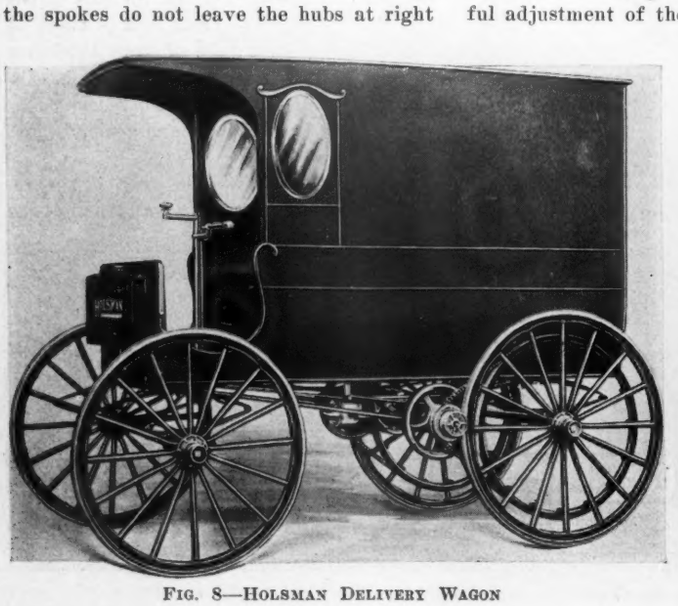


FIG. 8—HOLSMAN DELIVERY WAGON

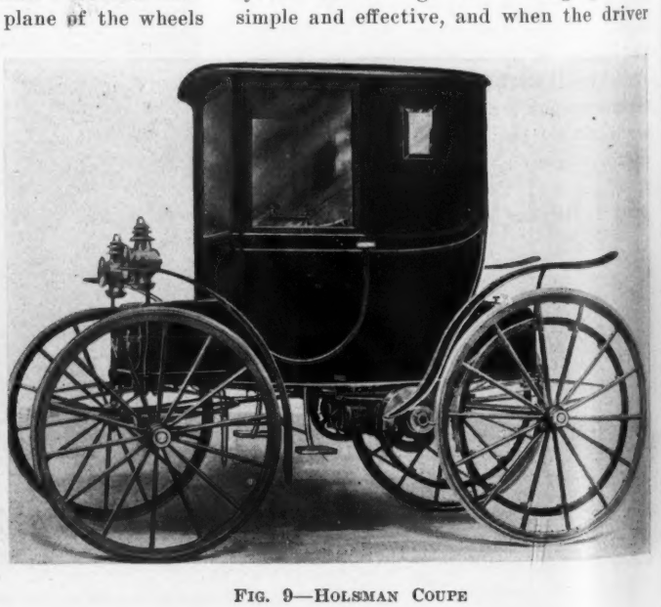


FIG. 9—HOLSMAN COUPE

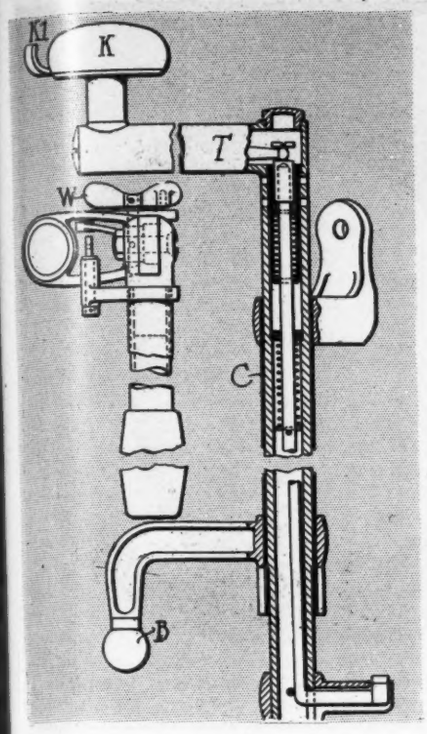


FIG. 10—HOLSMAN STEERING GEAR

sits at the left hand, the right hand is free to manipulate the spark and throttle system or to attend to other wants. For adjusting the spark wing nut W, is used, and adjustment is made by turning the same. The drag rod connects by means of a socket, to the ball B, on the end of the lever, and steering control is on a unit basis, that is to say, 1 degree of angular motion of the tiller gives an equal angle of cant of the road wheel.

Brakes on this product are effective, and the system is operated by foot by a natural forward pressure, applying the shoes to the large diameter shieves on the rear wheels. The shoes are faced with hose fabric, which has a high coefficient of friction, lasts for a long time, and is easily replaced. Owing to the considerable radius of the shieve, the brake pressure is most effective, and with this system a car, going at a considerable speed, may have its motion arrested within the shortest possible distance in feet.

Other Features of Holsmans

The good road performance, ease of control, and competence under conditions of soft going, are all factors for satisfaction, and although much of this performance can be traced to the use of wheels of large diameter, even so, to a vast extent it is fair to presume that close adherence to natural laws induce them to work with, instead of, against the designer and the user alike. At all events it is quite evident that increasing diameter of wheels eliminates the need of a long wheelbase, and if the solid rubber tires are not too large of section, the road performance will be surprisingly good. Indeed, it has been found time after time that the service to be at its best requires the use of solid rubber tires of surprisingly small section; whereas ill-advised spectators are wont to say the tires are too small, giving the reason for having them so a desire on the part of the makers to save expenses. There is nothing so far from the truth, and a ride in a car, under the two conditions, will convince anyone that increasing tire section beyond the barest necessity, considering extreme fiber strain, increases the bouncing effect, and prevents the spokes from doing the very work for which they are designed and most capable of doing.

SPECIFICATIONS OF HOLSMAN MOTOR BUGGIES

TWO-CYLINDER MODELS		FOUR-CYLINDER MODELS	
Bore	4 inches	Bore	5⅛ inches
Stroke	4 inches	Stroke	2½ inches
Front Tires	42x1¼ inch	Front Tires	42x1¼ inch
Rear Tires	44x1¼ inch	Rear Tires	44x1¼ inch
Tread	56 inches	Tread	56 inches

BELGIAN EXPORTS AND IMPORTS

Brussels, Nov. 10—During the first 9 months of this year there were imported into Belgium 110 more foreign cars than during the corresponding period in 1908. The value of the 283 imported cars was $356,349, the average value per car being $1,260, or $168 less than the average value of the 170 cars which were imported during the first 9 months last year. While the importation of cars increased, the exportation of Belgian cars also fell off, as far as their total value is concerned. In the 9 months 441 cars were exported, which is sixty-three more than in 1908 and eighty-nine more than in 1907. The total value of the cars exported this year was only $986,282, the average price per car being $2,236, while the value of the cars exported last year was $1,016,273, or an average of $2,953 per car. In 1907 the average price per car exported was $2,481. One of the best fields for the Belgian cars is British South Africa. According to a recent report of the Belgian consul in Johannesburg, seventy-seven Belgian cars, valued at $194,667, were received in Johannesburg in August of this year. This is a tremendous gain of business.

MOTOR FIRMS SUFFER FIRE LOSS

Detroit, Mich., Nov. 19—Fire today badly damaged the old Biddle House building on motor row, the upper floors being virtually gutted by the flames, while the lower floors were all severely damaged by water. The total loss was about $70,000, of which the largest share fell on the occupants of the structure, including the Firestone Tire and Rubber Co., whose damage the local manager, John V. Moore, placed at $20,000; the Republic Rubber Co., $2,000; the Jackson Auto Co., $2,500; the Detroit Tire and Repair Co., $1,000; the Studebaker Automobile Co., $1,000.

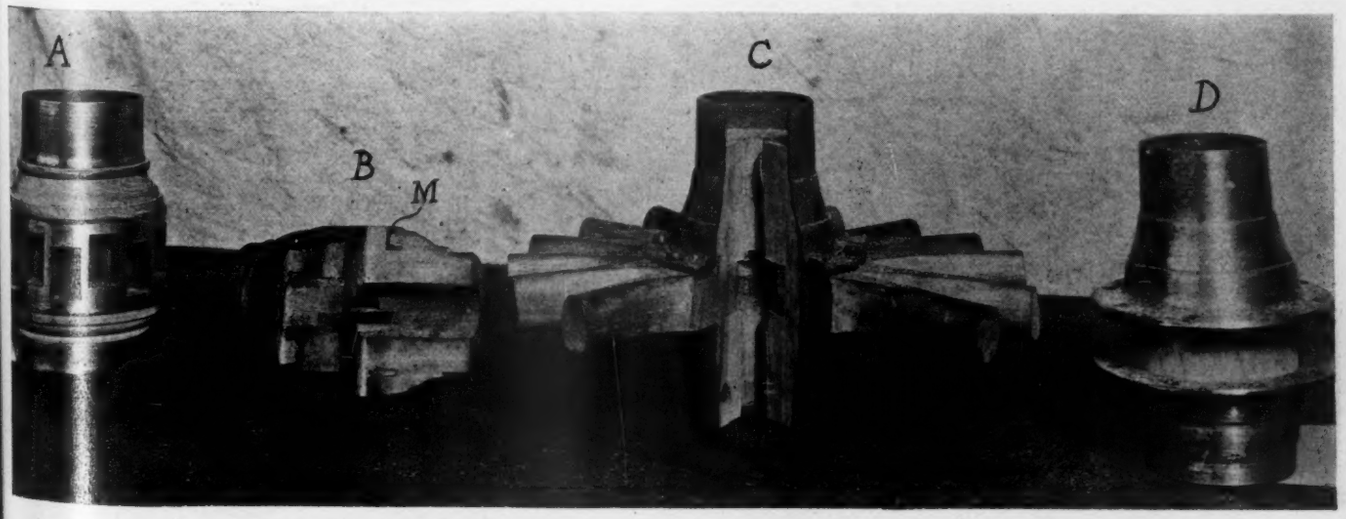


FIG. 11—COMPARISON OF VALUES OF DIFFERENT HUB TYPES

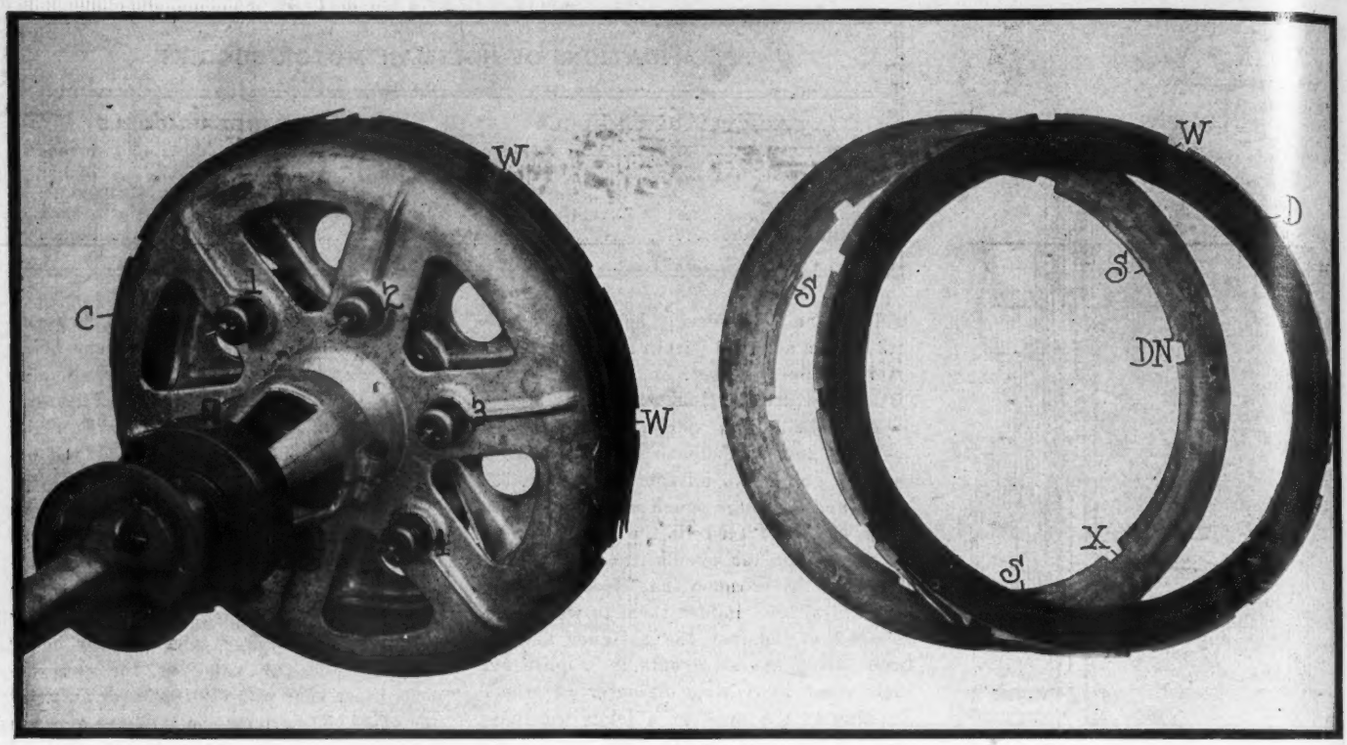


FIG. 1—ASSEMBLY AND TWO DISKS IN STEARNS DRY-DISK CLUTCH

Field of Motor Car Development

THE F. B. Stearns Co., Cleveland, O., in its 30-60 horsepower four-cylinder cars for 1910, has, while retaining the general design of previous years, introduced three important changes or improvements for 1910. These are, the use of a dry-disk clutch, the adoption of Bosch dual ignition system with one set of spark plugs, and the installing of a crankcase-contained lubricating system, whereby the external mechanical oiler of previous years is discontinued. Of these three improvements the dry-disk clutch comes first and is illustrated in Figs. 1 and 4. This clutch, which has been tested out for the past 15 months, is of particular interest because of the fact that one other manufacturer has introduced the dry-disk clutch for the first time on its 1910 cars. The new Stearns clutch consists of a comparatively small number of steel disks D, Fig. 1, of large diameter, held and driven by hardened steel keys K, Fig. 6, in the rim of the flywheel. With the exception of the first and last these driving disks are lined on both sides with an asbestos cover which is riveted to the disks by tubular steel rivets. Between each adjacent two of these driving disks are hardened ground steel driven disks DN, Fig. 1, which are not faced with the asbestos fabric. These disks have integral springs S which tend to separate them from the driving disks when the clutch is disengaged. Both sets of disks are, as illustrated in Fig. 4, nested between carriers H and K, to which the driven disks, DN anchor. Engagement is through a set of six spiral springs designated respectively 1, 2, 3, 4, 5, 6, these being regularly spaced in openings in the carrier H. Owing to the large size of the disk, as well as the asbestos fabric facing, the company claims the pressure required to operate the clutch is extremely light, the six springs illustrated sufficing. From the driven disks power is transmitted to the clutch drum, which is mounted on the ball bearing projection of the crankshaft, and is connected to the primary shaft of the transmission by a universal. A suitably mounted truss block in connection with

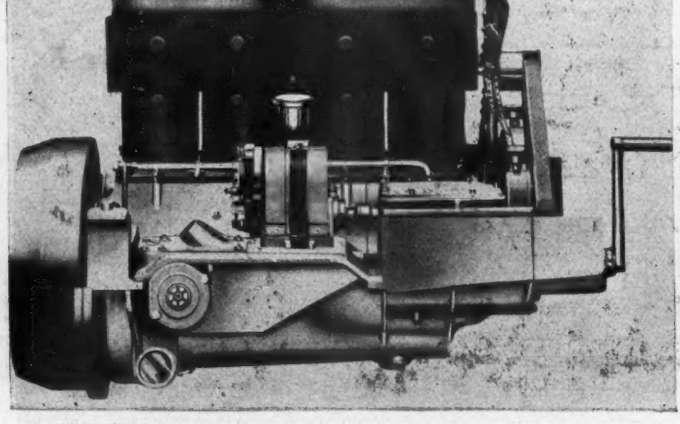


FIG. 2—ACCESSIBLE MAGNETO LOCATION ON STEARNS

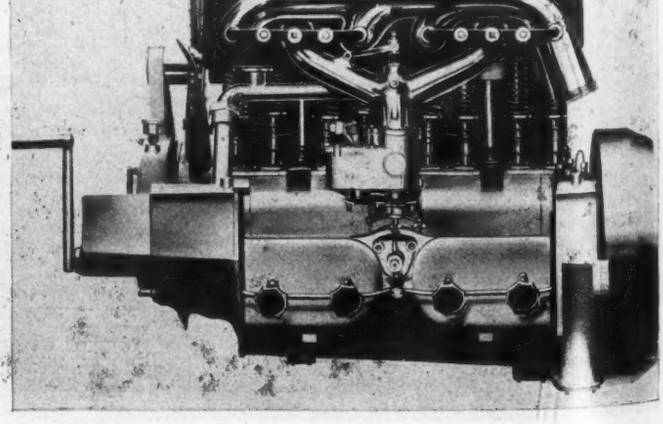


FIG. 3—VALVE SIDE OF STEARNS CAR

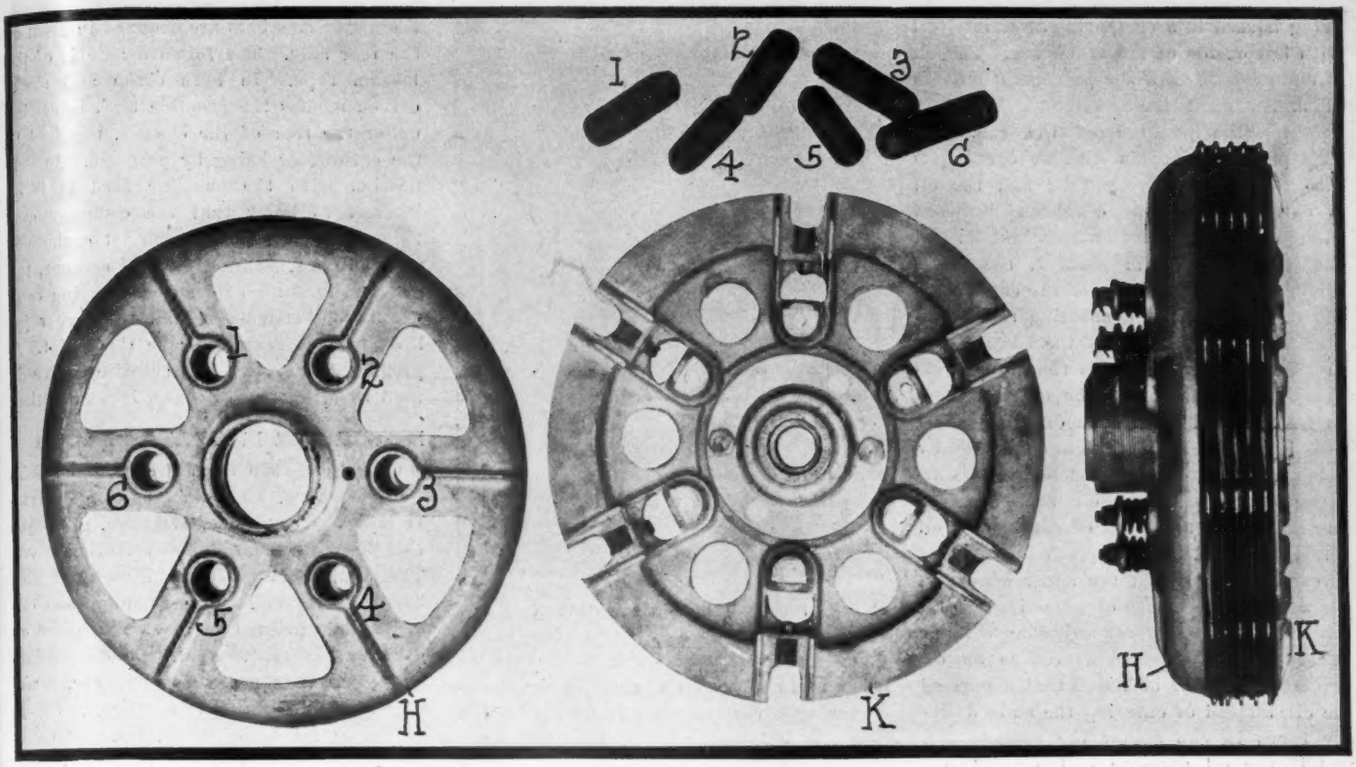


FIG. 4—TWO DISK CARRIERS SHOWING SIX ENGAGING SPRINGS

The 30-60-Horsepower '10 Stearns

the clutch pedal serves to release the spring pressure for engagement. The entire rotation part of the clutch is mounted within the flywheel and centered directly by the extension of the crankshaft in such a way that the possibility of mal-alignment is avoided.

The clutch is light and its weight has been used advantageously to replace the weight of material taken from the rim of the flywheel. This reduction in weight permits of easy gear system. Notwithstanding this reduction in weight there is a large expanse of frictional surface which is used to secure gradual engagement and overcome any tendency to slip. One adjustment is provided whereby without disconnecting of the operating mechanism any wear may be taken up.

The ignition improvement in this model, namely, the adoption of the Bosch dual system, greatly simplifies the general appearance of the motor in that but one set of plugs is used instead of two, and also the timer is eliminated. With the Bosch dual system the only part required on the dash is the small cylindrical coil which operates in conjunction with the battery for starting purposes. The Bosch magneto is of the high-tension type, not requiring a step-up coil. It is mounted accessibly on the side of the motor opposite the valves, where it is secured by the usual metal strap, Fig. 2. The opposite side of the motor is illustrated in Fig. 3, and carries the two inspection plates to the crankcase as well as the carbureter, both sets of valves, the manifold, and the intake water piping.

The adoption of a crankcase-contained oiling system on this motor has greatly simplified the external appearance of it.

Fig. 7 illustrates the improved crankcase oiling system of the Stearns cars. The oil level L in the base of the crankcase is the main source of supply, and the oil pump composed of a pair of gears G is the circulating source. This pump draws the oil from the reservoir L through the screen F, as indicated by the arrows, and by way of an inlet J to the pump gear, the pump

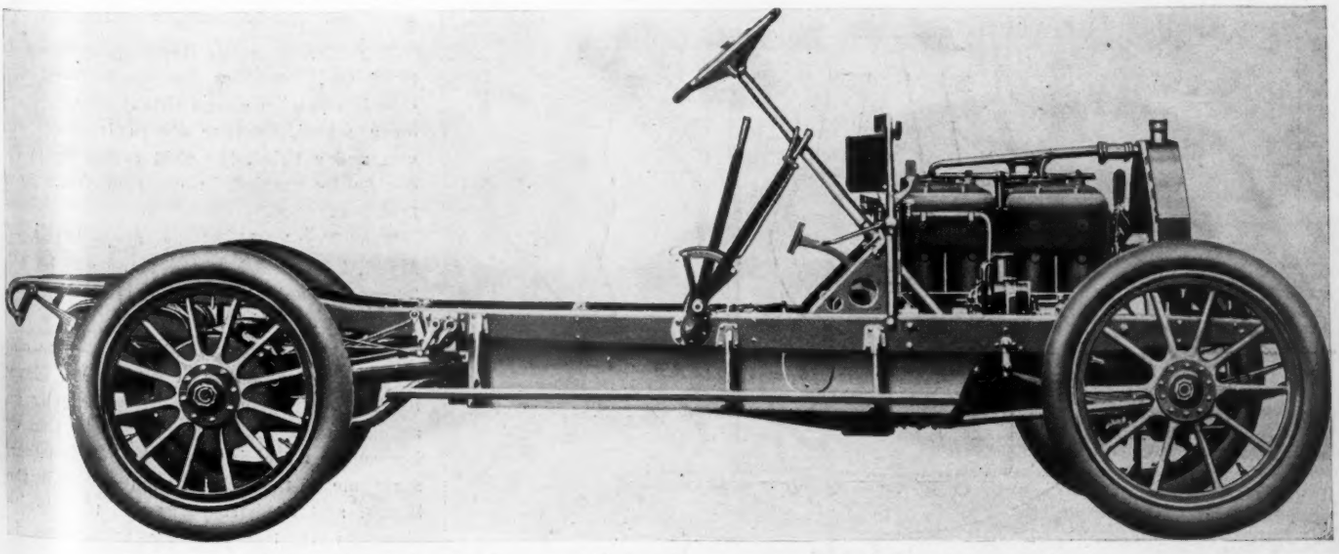


FIG. 5—SHAFT-DRIVE CHASSIS OF STEARNS 30-60 CARS

being housed in a compartment K integral with but ouside of the crankcase. The oil is elevated through the passage P outside of and around the driveshaft S, which operates the pump from the camshaft. This passage connects with an opening D into the main delivery tube and the oil is carried across the crankcase between the cylinders by pipe to a manifold M, and thence by individual pipes I, the oil is directed against the side of the connecting rod C. The Stearns connecting rod differs from the ordinary ones of the I-beam type in that the channel faces the side. This fact is made use of in the oiling system so that the oil from each of the pipes I falls into this channel and is conducted by holes to the connecting rod bearing. Carrying the crankshaft on ball bearings eliminates the necessity of conducting oil direct to these, as the splash is sufficient to care for them. At the upper hand corner appears the means of adjusting the oil flow. N is a screw for adjusting the lift of the valve V, which serves as an oil regulator. It will be noted that a part of the oil, instead of entering the main delivery tubes D, can follow the passage D1, and if the oil pressure is too great lift the by-pass valve V against the tension of the spring S. In this way a portion of the oil being diverted from going to the motor parts the oil flow can be regulated to the greatest nicety. O is an outlet from the by-pass valve chamber, and from this pipe the oil is carried back into the reservoir. The reservoir in this motor contains 2½ gallons.

In practically all other respects this Stearns model remains unchanged. This company was one of the early exponents of the selective gearset and adheres to it. The car can be designated one from radiator to rear axle, these bearings being used for the crankshaft, camshaft of the motor, for the transmission and the rear axle. Timken roller bearings are used in the

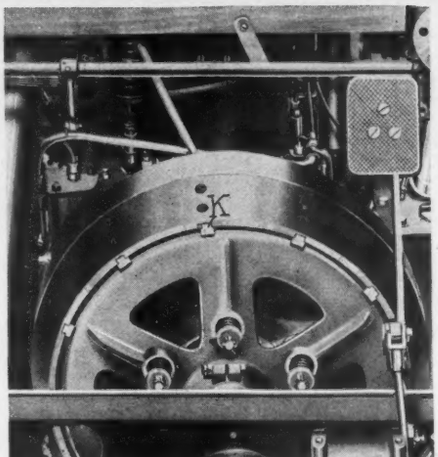


FIG. 6—NEW STEARNS CLUTCH

front wheels, the cars are built both as chain and shaft-driven types. In the shaft-driven type the rear axle is a combination live and stationary type, the stationary portion is a forging with a diamond-shaped center and extending arms. A differential housing is nested within the diamond and the extending arms are drilled to receive the driveshafts for the rear wheels. This makes a particularly rigid construction and one which has been used on shaft-drive Stearns since they were brought out. In connection with this rear-axle system is a torsion tube inclosing the propellorshaft, this torsion tube ending in a yoke at its forward end and which yoke is trunnioned to a cross member of the frame. In the axis of this trunnion is used the only universal joint in the system.

The running gear of the Stearns car is characterized by heavy pressed steel channel side members of the frame supported in front and rear on semi-elliptic springs, these side members are dropped in front of the rear axle. The forward axle is of the I-beam type. In both chain and shaft-driven models the gasoline tank is carried under the rear of the chassis, the feed to the carbureter being by pressure. In connection with the gasoline feed it is of interest to know that the company continues the use of its double-jet carbureter which it has used for several seasons, the smaller jet is used for speeds ranging from one to 30-horsepower, and the larger jet brought into service above this point. A progressive system of throttle valve is used to bring these nozzles into operation.

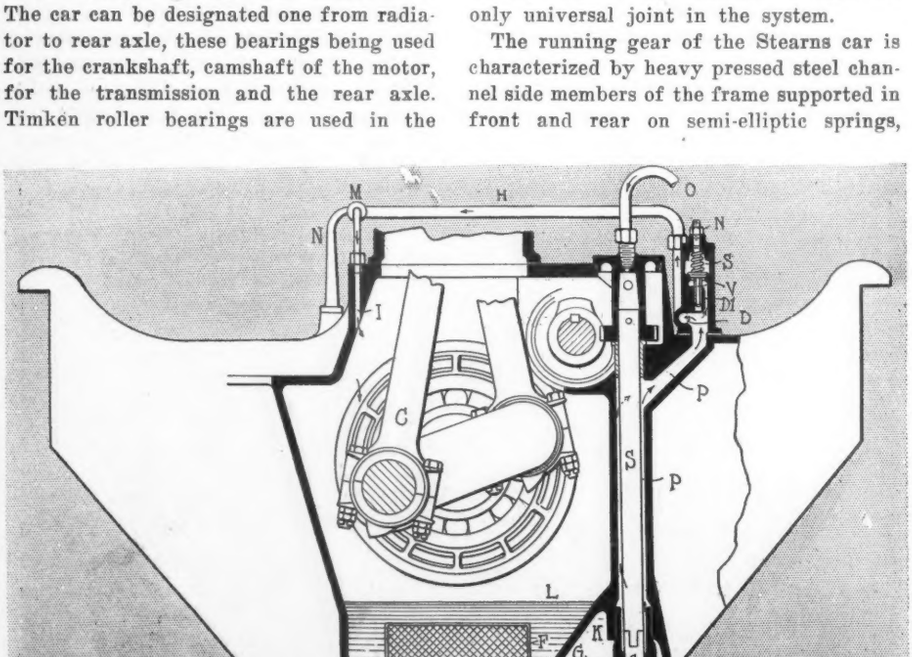


FIG. 7—NEW OILING SYSTEM ON STEARNS 30-60 CHASSIS

MOTOR CAR LITERATURE

Catalog H-1909 from the National Tube co., Pittsburg, Pa., is an edition de luxe. It is a 7½ by 5 size, 470-page, gilt-edged volume with flexible black leather cover. The catalog is profusely illustrated with half-tone reproductions, some in two colors, and is printed in black and green on a heavy enameled paper. Its descriptions and price lists are very complete, covering such articles as couplings, fitting, valves of all descriptions, radiator tubes, hydraulic fittings and valves, tubular goods, and many other specialties. Much time and thought has been spent in compiling this volume, and more particularly the index, which is so arranged as to make it possible for a person to locate the same article under different names.

The G. & J. Tire Co., Indianapolis, Ind., has mailed its 1910 catalog, containing a complete list of its tire sizes and prices, together with such tire sundries as tools, patches, sleeves, etc. The cover is made attractive by an embossed tire, within which is the G. & J. monogram.

Volume 1, Number 12 of "Reo Echo"—the house organ of the Reo Motor Car Co., contains an interesting and well-illustrated story on "Autoing Through Virginia," "New Uses of a Motor Car" and many more interesting features. The cover page is a half-tone reproduction of R. E. Olds, father of the Reo, in his new model—a four-cylinder Reo 35.

A folder from the Reynolds Automobile Skid Co., describes its product—a skid. One illustration shows this device in place on a wheel, another shows it ready for use, and a third, the skid rolled up in order to be carried in compact form in a tool box.

The Frank Mossberg Co., Attleboro, Mass., has mailed to the trade a 6 by 4½ 32-page booklet, listing its line of wrenches and bells.

"White Bulletin Number 16"—the official house organ of the White Co., Cleveland, O., is made most interesting by an account of a 2,500-mile demonstration of kerosene as fuel in the 1909 Glidden tour, a resume of the highway movement in the South, and a short story of the White steamers in the military maneuvers in Massachusetts last summer.

Manufacturers' Communications

AMERICAN TOURISTS IN FRANCE

BUFFALO, N. Y.—Editor Motor Age—With the approach of winter and the resulting cessation in motor car touring one of the daily newspapers of Paris has issued a resume of the touring season. By securing the number of triptychs or customs passports issued by the various clubs and touring associations and estimating from other sources it is made clear that the present season has seen more Americans touring France than ever before, the paper saying:

"There are so many doorways into France that it is practically impossible to determine accurately the number of motorists who annually pass through for the purpose of touring over republican highways. Such figures as are available, however, show that the touring season, just closed, brought a larger number of motoring visitors from America and England than any preceding year."

It is estimated in the season's resume, counting six people as an average party that 24,000 motor car tourists, from America and England, visit France each year, and this estimate is made the basis for a criticism of a French government proposal for a tax on visiting tourists, the argument being: "It is not always realized what a valuable asset the American and English tourist is to France. The average motorist remains 1 month. The American rarely stops less than 6 weeks, while the Englishman is satisfied to 'run over' for a much shorter period. The minimum expenditure of a party of touring motorists is 50 francs a day for each person, this sum representing hotel accommodation, food, upkeep of the car and incidentals, but ignoring amounts spent on works of art, presents and other items. On such a basis the 24,000 visitors introduced into France this year by the motor car must have left behind no less than 36,000,000 francs. In view of such a train of gold the proposal of the French government to impose a tax on visiting motorists appears to be unsound policy."

That the touring clubs that supply information to tourists and the spare parts and information bureaus of American motor car manufacturers have done away with many of the bothers of tourists in former years is shown conclusively by the following extract from the season's resume:

"A feature of the development of foreign touring is the number of Americans who now visit Europe in American motor cars. Everything has been made so simple by the various touring associations that the American motorist plans for a tour through Europe with as little fear of difficulties as if he were about to make a run through the Berkshires. The extent of this movement is shown by the fact that three leading factories have opened Paris touring bureaus in the last 2 years. N. S. Goodsill, in charge of the Pierce-Arrow Motor Car Co.'s Paris branch, reports 112 cars of that make in the first 9 months of the year and an estimate of 125 for the whole year. 'The greater number of cars are the large six-cylinder models, carrying five to seven persons,' he said. 'They usually remain in Europe from 6 weeks to 2 months, visiting France, Germany, Italy and England principally. Intending tourists should obtain membership in the Touring Club of France before leaving New York, and at the same time secure a triptych for passing the French, Italian or German customs if they propose to land in one of those countries.' "—Pierce-Arrow Motor Car Co.

AMERICAN AND FOREIGN ELECTRICS

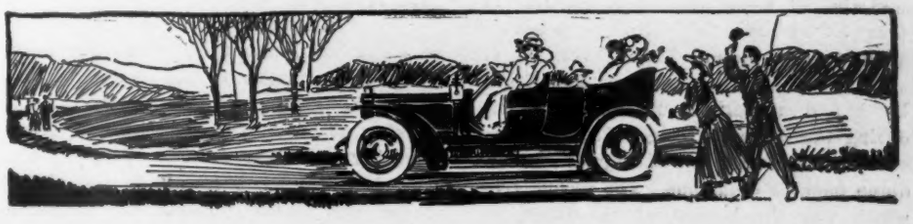
Cleveland, O.—Editor Motor Age—The European electric is only manufactured in the heavy brougham and cab models, and there is a great demand abroad for the light, easily-controlled electric runabout. The European electrics use thin plates in the batteries, which while they give a greater mileage at the beginning are short-lived. The series-wound motor is becoming standard and all of the later models are of the single-motor type with double speed reduction and shaft drive. The hub motor built directly in the wheel, which has been so much discussed, is rapidly disappearing due to its inefficiency in starting and hill-climbing and the frequent necessity of repairs on account of the severe direct vibration of the wheel on the road. The drum type controller is standard in all European electrics, and the electric brake and recharging points formerly used have been discarded. The whole tendency abroad is to simplify the electric. European electro-chemists experimented with alkali batteries for many years, but could not overcome the disadvantages of the great potential drop under overloads and their limited recuperative power, a fault which the late American batteries of this type still show. The pasted lead battery is the standard abroad. Solid tires and cushion tires have both been used abroad, especially for taxicabs, but on account of the heavy vibration of the car and the loosening and breaking of vital mechanical parts, they have been practically discarded, and the late cars are equipped with pneumatic tires. Even the electric trucks and buses are being equipped with pneumatic tires of the twin and triple type—that is, two or three individual tires side by side on the same wheel.—E. Gruenfeldt, Chief Engineer Baker Motor Vehicle Co.

FREE AIR FOR MOTORISTS

New York—Editor Motor Age—Some time ago the makers of Fisk tires conceived the idea of equipping all Fisk branches with air boxes, which are placed on the sidewalk close to the curb, for the convenience of motorists. Upon opening the box, a rubber tube is found which is attached to tire valve and a lever and scale regulate the amount of compressed air desired. Keys to these boxes are freely furnished to motorists upon request; some of the company's branches having given out no fewer than a thousand keys to local owners and drivers, who are able to obtain inflations at any hour of the day or night. At the New York city branch there is no box outside, the supply being provided from a rubber tube at the rear entrance, owing to the fact that the city will not permit encumbrances on avenue sidewalks and also forbids making repairs or adjustments at the curb. The Fisk Rubber Co. inaugurated this free-air system in the hope of motorists keeping their tires properly inflated without laborious effort and thus add to the life of their tires.—Fisk Rubber Co.

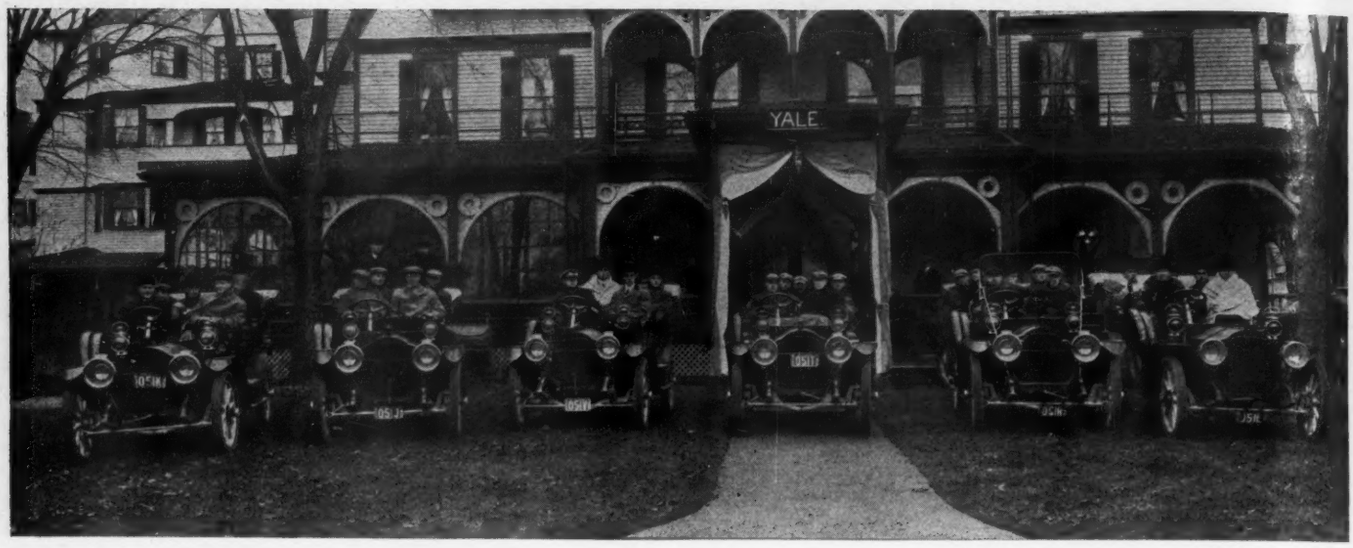
NOT THE WHITE STEAMER

Cleveland, O.—Editor Motor Age—In the story of the New York-Atlanta tour the correspondent of Motor Age stated that on the Greensville-Commerce leg "No. 29 White steamer, White Steamer Auto Co., Atlanta, withdrew at Anderson, the lunch control, with a broken crankcase, probably due to a bent crankshaft," and that the car was towed by Mrs. Cuneo. Evidently there has been a confusion of names, for No. 29 was a White Star gasoline car, made in Atlanta, and not a White steamer. The three White steamers in the tour all went through with perfect scores. There was no such trouble experienced, nor was there any such talk to the effect that the White steamer would endeavor to go into Atlanta under its own power after it had been repaired, for it was not the steamer.—White Co.



From the Four Winds

N S E W



MEMBERS OF YALE'S CHAMPIONSHIP FOOTBALL ELEVEN ENJOY RIDE AROUND BOSTON IN PACKARDS

Stop Boys Flipping—The police department at Kenosha, Wis., has been asked by owners to stop flipping by boys as the result of a serious accident to a lad who clung to the tonneau and lost his hold.

Show at Binghamton—The Binghamton Automobile Club, of Binghamton, N. Y., will hold a motor show in the state armory in that city from February 21 to 26. Several applications from prospective exhibitors are being received by Secretary Roy W. Whipple.

Fixing Portland Streets—The work of macadamizing the driveway around Council Crest, Portland, Ore., is now under way, hard surface pavement being laid. A large loop is being constructed for carriage and motor cars around this scenic driveway, and in addition Vista avenue, Montgomery avenue and Mount Zion, all popular drives in Portland, will be included in the improvement.

Youthful Driver on Tour—Driven all the way from Denver to San Antonio, a distance of 1,385 miles, by little 11-year-old Archie Smith, the Stoddard-Dayton touring car of J. P. Smith of Denver rolled into the Alamo City a few days ago bearing the family of its owner. The party will winter in San Antonio and Corpus Christi, using the car for frequent tours of the southern part of Texas.

Are Ardent Tourists—Mr. and Mrs. A. E. McCalla, of Columbus, Ohio, recently returned from their third trip of the season, after covering about 12,000 miles in all three. The trips have been made in a Knox and no serious mishap took place during the three journeys. The first tour was in northern Ohio, Michigan, and Indiana back to Columbus. The second trip, which was the longest of the three, included northeastern Ohio, a greater part of the state of New York, Pennsylvania, and New England. The third trip was through Michigan and Indiana.

Must Put up Signs—Although the new Wisconsin law providing for guide posts makes it obligatory for town boards to erect the signs by November 1, there apparently is an inclination to hold off until the last minute. Few townships have complied with the law up to this time and members of the Wisconsin State Automobile Association will take steps immediately after the expiration of the prescribed time for enforcing the law. The law is mandatory.

Wisconsin Wants Convict Labor—M. C. Moore, of Milwaukee, president of the Wisconsin State Automobile Association, urged the employment of convict labor in highway improvement and good roads construction, at the session of the special Wisconsin legislative committee investigating the good roads problem, at Milwaukee. Several prominent owners claimed this system to be highly unsatisfactory and that it would add to the difficulties of the problem.

Working on Virginia Roads—Virginia still is pushing work on the roads. The past 2 or 3 weeks the weather has been extra good and the convict forces have done much excellent work. The state good roads association is in the hands of its president, Senator Charles T. Lassiter, of Petersburg, who now is and has been using every means in his power to advance the cause. Mr. Lassiter is not working so much for the direct interest of either one class or the other, but his work is doing much to add to the pleasure of the motor tourists in Virginia. Much of the Virginia roadway that has been opened recently is of the sand clay type. Unlike the macadam it does not get so often into ruts or require so much attention.

Making Road Experiment—As an experiment Union county, Ore., has macadamized 2 miles of the worst road in the county. Booth lane is a road which is used by everyone crossing the county to La Grande, Ore., and in consequence a great amount of money has been expended on this road.

Show Colors Selected—The committee of arrangements for the motor show to be held in Columbus under the auspices of the Columbus Automobile Club, December 25 to January 1, has decided to decorate the Columbus auditorium with a combination of white and green. The decorations will be in accordance with the Yuletide and will be most elaborate. In all there is 14,451 square feet of space for the car exhibits. The admission will be reduced from 50 to 25 cents and it is expected to have at least 60,000 visitors. Special rates will be given on all railroads.

Work of Syracuse Club—The Automobile Club of Syracuse, of Syracuse, N. Y., which has grown to nearly 400 in membership within the past year, is contemplating the establishing of a monthly club bulletin. The club has done an extensive work during the summer in the matter of posting road signs and getting new members. Nearly 150 names have been added to the list and signs have been posted along every main road leading out of the city for a distance of 40 and 50 miles in many instances. By special arrangements with the town and village boards requests for signs have been com-

ing into the office of Secretary Forman Wilkinson all summer. These are then prepared and sent to someone living in the locality who has assumed the responsibility of posting and protecting them from being defaced by miscreants.

Plans Macadam Highways — Gogebic county, Mich., is about to start on the construction of a fine system of macadamized highways. The annual expenditure will be $30,000 until the work is done. The first road will be a trunk line from Ironwood, through Bessemer to Watersmeet.

Compiles Ohio Road Laws—State Highway Commissioner J. C. Wonders, of Ohio, will soon issue a booklet containing all the laws relating to highways and road improvement. The booklet will be issued to show every community in the state the method of securing appropriations for road improvement, and the laws that provide for their maintenance. The booklet will contain full explanation of the working of the designing board.

After a Virginia Route—Much interest is being provoked between the owners between Richmond and Newport News, Va. The idea is to bring about a movement for 75 miles of high grade roads from the capital to the sea coast. The proposed road will go by way of Williamsburg, including historical points of the colonial war and the war between the states, making it the most interesting stretch of track in the south for tourists.

Rival Show Proposal—The Buffalo Automobile Trade Association announces that it will hold a motor car show at Convention hall in Buffalo, N. Y., March 7. This exhibition will be separate entirely from the Buffalo Automobile Club's show, to which reference has already been made in Motor Age. The members of the association recently met at the Iroquois hotel, Buffalo, and decided upon their show. Since the meeting it is stated that peace may prevail and the dealers combine with the club.

Two Shows in Kansas City—The recent division in the ranks of the Kansas City Motor Dealers' Association, resulting in a new organization, is about to cause a second peculiar condition, the holding of two motor shows within 3 months. The split was supposedly over a show, the fifteen motor companies in the new Motor Car Trade Association positively going on record last week in opposition to a 1910 exhibition. But an announcement to the effect that the new association had engaged Convention hall for the week of January 17 for a show is made. H. E. Rooklidge, president of the old association until the resignation of the Maxwell-Briscoe Motor Car Co., forced his withdrawal. Now Rooklidge has been elected president of the Motor Car Trade Association. There are sixty-eight motor companies in Kansas City and the members of the old association feel certain that all of the sixty-eight except the fifteen are lined up for the March show, ignoring the January show entirely. The fifteen believe they can give a show without help.

Pay For Improvements Themselves—Owners at Fond du Lac, Wis., who use the main highway between that city and North Fond du Lac have raised a subscription fund and hired a gang of workmen to put the highway into passable shape. Requests for improvement were unheeded. Crushed stone and gravel are being used and a fine macadam road is the result.

Cincinnati Announces Dates—The Automobile Club of Cincinnati show will be held in Music hall, the largest exhibition hall in the city, from February 21 to 26 inclusive. It is promoted and held under the auspices of the Automobile Club of Cincinnati, not for profit but to further the interests of motoring. Requests for information as to exhibition space should be forwarded to Jesse Lippencot, Gibson house, Cincinnati.

Yale Eleven Given Ride—The members of the Yale football team have a better knowledge of what the suburbs of Boston look like now, for last week Alvan T. Fuller, Boston agent for the Packard, furnished them with half a dozen cars to take a spin over the splendid park roads of the Hub. They covered about 50 miles and had a great time. On the day of the game they were taken to the stadium and back in the cars. The wonderful growth of the motor industry was strikingly exemplified at the Harvard-Yale football game last Saturday when parked outside the stadium near Harvard college were at least 3,000 machines of every description. They came from all sections of the country, too. One motor party came to the game from Lincoln, Neb. From Buffalo came a party comprising E. L. Thomas, W. H. Van Dusen, Fred Nehras and George Salzman from the Thomas factory. New York sent over several hundred motor parties and from all sections of New England came hundreds of others.

Salt Lake Show Dates—The inter-mountain west is to have a show. It will be held at Salt Lake City, which furnishes cars for Utah, Idaho, Wyoming, Nevada, Montana and western Colorado. The dates are February 19 to 26. Such is the announcement of the Utah Automobile Dealers' Association, which already has secured the Auditorium, with a floor space of 150 by 200 feet. W. D. Rishel has been engaged as manager and has opened offices at 135 East First street south.

Syracuse Talks Show—At a meeting of the Automobile Dealers' Association of Syracuse, of Syracuse, N. Y., plans for the second annual show were discussed. It is the intention of the dealers to make the show this year bigger and better than ever. If possible the entire floor space of the New York state armory will be secured. Although the exact date has not been fixed, it is expected the show will be held in the third week of March, immediately following the Boston show.

Right Kind of Spirit—One thousand dollars was recently contributed by the citizens of Bend, Ore., for the improvement of the roads in that vicinity. With this amount as a starter it is expected that the best motor road in central Oregon will be built, some 75 miles in length, which will tap the new homestead lands which are being taken up here. A number of the residents are moving to their new homes by motor cars, which promise to play an important part in the opening of this new country.

ARCHIE SMITH, 11 YEARS OLD, WHO DROVE A STODDARD-DAYTON 1,385 MILES

Among the Makers and Dealers

Takes the Mitchell—L. L. Reeves, of Monessen, Pa., has secured the agency for the Mitchell cars.

Will Change Name—The Toledo Motor Co., of Toledo, O., has changed its name to the Willys-Overland Co. by amended articles recently filed with the secretary of state.

Stephens Sells Out—Minard Stephens has sold his interest in the partnership which conducted the Wilmington garage, at Wilmington, O., to James M. West, who will soon incorporate the West Automobile Co. to conduct the business.

Membership Now Full—The Franklin Automobile Co., the Pittsburg-Mitchell Co., the McCurdy-May Co., the Vestal Motor Car Co. and Urling & Co. have been elected members of the Pittsburg Automobile Dealers' Association. The membership limit of twenty is now reached.

Opens Mason Branch—The Parsons Band Cutter and Self Feeder Co. has established a sales branch in the old Board of Trade building in Indianapolis with C. D. Rodebaugh in charge as manager. This company recently bought the Mason factory, and the Indianapolis branch has received a line of Mason cars.

Kerr and Doane Partners—Melville W. Kerr and James E. Doane, formerly connected with the Buick Motor Car Co., of Syracuse, N. Y., have combined under the name of the Kerr-Doane Motor Co. to handle the American Simplex and Velie cars. It is the intention of the new firm to build a garage and show room as soon as a suitable location can be secured.

Livery Company Incorporated—The McDonald Automobile and Livery Co., of Columbus, O., with a capital stock of $50,000, has been incorporated to take over the livery business of M. J. McDonald at 1082 North High street and to add a garage and McDonald, B. B. McDonald, H. M. Evans, F. T. Jones, J. A. Taft and G. E. Bazler. sales agency. The incorporators are M. J. The company will soon sign up for several agencies. M. J. McDonald will be president and general manager; F. T. Jones, treasurer, and J. A. Taft, secretary.

New Oklahoma Agent—B. E. Gridley has Auburn agency for Oklahoma and Texas, and the De Tamble for Oklahoma. He will operate from Okeene, Okla., until the first of the year, when he will open in Oklahoma City.

Hans Wagner Applies—The Rider-Lewis Motor Car Co., of Anderson, Ind., has received an application from Hans Wagner, the well known shortstop of the Pittsburg National League team, to become its representative in western Pennsylvania, including Pittsburg. It is possible the agency arrangement will be made.

Hoosier Addition—As a distributing agency for the Indiana Motor and Mfg. Co. the Indiana Motor Sales Co. has been organized in Indianapolis. The stockholders and directors are Benjamin F. Meixell, C. O. Britton and Donald J. Haden, the latter being secretary of the manufacturing company which has located at its factory at Franklin. The sales company has an authorized capitalization of $10,000.

Handles Parry at Home—After December 1 the Parry Automobile Co. will have an agency in its home city, Indianapolis. This will be the Shoemaker-Smith Automobile Co., which has leased the corner room on the new Pennway building at Pennsylvania and New York streets. At present this company has a temporary office at 418 American Central Life building.

Working Under Penn Charters—The Charleroi Automobile Co. has just been formed by R. M. Smith, J. F. Donaghy, C. S. Van Vorhis and others of Charleroi, Pa., and will operate under a Pennsylvania charter. It will have two or more agencies and will also have a repair and storage plant. H. N. Mitchell and John C. Shaw, of Uniontown, Pa., have leased the building formerly occupied by the Fayette Automobile Co., of that city, under the name of the Tri-State Garage Co., which will incorporate with a Pensylvania charter. They have secured the agency for the Ford.

Bell a Rambler Manager—W. H. Bell has resigned the position of manager of the Chicago branch of the Hartford Rubber Works Co. to become manager of the Chicago Rambler branch.

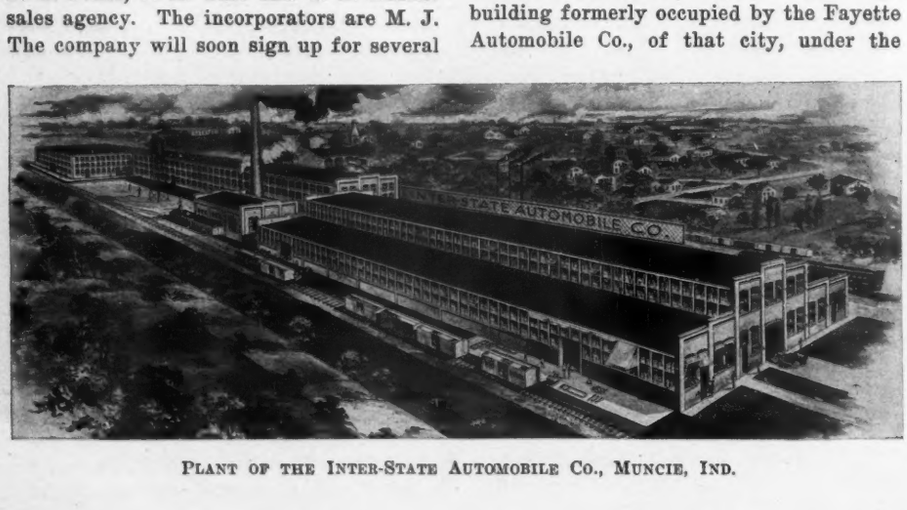
Opens Atlanta Branch—The Federal Rubber Co., of Milwaukee, has opened a branch at 102 Pryor street, Atlanta, Ga. Since moving into its new plant, at Cudahy, the capacity has been increased to 250 tires and 500 tubes daily.

Pittsburg Show Committee—The show committee of the third annual Pittsburg show to be held in Duquesne garden next April is composed of Frank Saupt, of the Hiland Automobile Co.; George P. Moore, of the Keystone Automobile Co.; James R. Newell, of the Wilkinsburg Automobile Co., and W. N. Murray, of the Standard Automobile Co.

Broad Oak Offices—The Broad Oak Automobile Co., of Columbus, O., which conducts a garage and sales agency on East Broad street, has been reorganized by the election of Charles C. Kouns as president and A. B. Whitney as vice president in the place of O. W. and M. F. Loofborrow. D. I. Hoch remains as secretary-treasurer. The company handles the Pierce-Arrow, Hudson and Chalmers-Detroit.

Adds to Smith Plant—The A. O. Smith Co., of Milwaukee, manufacturer of pressed steel frames and parts, which is building a $500,000 plant at Twenty-seventh and Hopkins streets, Milwaukee, has purchased 15.5 acres adjoining its present holdings to provide for future extensions. The new plant, employing 1,500 men, will be ready about January 1. The main building is 1,025 by 287 feet, the power plant 400 by 70 and the offices 148 by 60 feet, two stories high.

Wisconsin Happenings—The Barker Auto Co., of Chippewa Falls, Wis., has erected a large garage and salesroom on East Spring street. It will be styled the Home garage. The company is agent for the Jackson and Fuller lines. A. Kletti, of Lomira, Wis., has been appointed district agent for the Imperial car, which is being distributed by the LaCrosse Co., of LaCrosse, Wis. Knaack & Zehms, of Sheboygan, Wis., are building a large garage at Georgia avenue and South Thirteenth street in that city. The dimensions are 36 by 52 feet. The concern handles the Jackson in the vicinity of Sheboygan. Tuschen Brothers' garage, 211-215 North Third street, Watertown, Wis., has been appointed agent for the Maxwell. The Kent Motor Car Co., of Kenosha, Wis., a



PLANT OF THE INTER-STATE AUTOMOBILE CO., MUNCIE, IND.

large garage and agency concern, has established a taxicab service. Kenosha is the first city in Wisconsin outside of Milwaukee to have the taxicab.

Dentist a Dealer—Dr. R. C. Wescott, a Columbus dentist, has taken the central Ohio agency for the Regal. He has several cars for exhibit at the Columbus motor show.

Stuyvesant Company Organized—The Stuyvesant Motor Car Co., of Cleveland, O., with a capital stock of $200,000, was incorporated with the secretary of state recently by F. E. Stiverson and others.

Opens New Quarter—The Franklin branch in Philadelphia, with quarters at 138 North Broad street, has opened its new two-story garage and repair shop at 3430 Chestnut street.

Houk Back to the Hub—C. G. Houk, who was one of the pioneers in the bicycle game, and for the past decade has been living in London, has returned to Boston to accept a position with Alvan T. Fuller, agent for Packard and Cadillac cars in the Hub.

Becomes a Car Agency—The Franklin Cycle and Supply Co., of Columbus, O., which has been operating a supply store and held several agencies for motor cycles, has branched into the motor car business and has secured the central Ohio agency for the Demot. C. E. Barr is general manager of the concern.

Will Handle Cars, Too—Within a short time G. H. Westing & Co., the pioneer motor cycle dealers of Indianapolis, will carry a line of motor cars. The company has just arranged for a 20-year lease on a two-story brick fireproof building to be erected immediately at 315 North Delaware street. The concern has not decided upon the line of motor cars it will represent.

Huhn Made Manager—C. E. Huhn, formerly local eastern manager of the Puritan Soap Co., of Philadelphia, Pa., has been appointed local eastern manager of the motor car department of the Keystone Lubricating Co., which has opened a large office and warehouse at 1327 Race street, Philadelphia. The building is sufficiently modern to warrant the sub-leasing of offices on the upper floor of this building. These will be leased only to concerns of good repute in the accessory business.

New Fire Engine Designed—The Howe Engine Co., of Indianapolis, which manufactures a combination motor fire engine, hose wagon and chemical apparatus, has plans for a machine to be built with two four-cylinder motors, operating two sets of four-cylinder pumps. This will be designed for metropolitan service and it is probable one will be placed in the Indianapolis department. On November 17 the company made a successful demonstration before city officials with a six-cylinder car, operating a six-cylinder pump. The cylinders are each 5 by 5½ inches and will pump about 600 gallons of water a minute. The apparatus used in the demonstration was built for the fire department at Galveston, Texas.

A Chicago Garage—Charles Hagmann's at Hoyne Street and Jackson Boulevard

Has Trunk Line—L. Glesenkamp Sons & Co. have secured the agency for Pittsburg and western Pennsylvania for the Glesenkamp commercial motor wagon. The Glesenkamp company will also handle the Acme next year.

Ronson Wrench Patented—Cryder & Co., of Park avenue and Sixty-third street, New York city, are just in receipt of advices from their patent attorneys that the United States patent office has allowed the full patents on the Ronson Nine-in-One wrench.

Buffalo Incorporation—The Greyhound Motor Works has been incorporated in Buffalo with a capital of $100,000. The concern will manufacture motor cars and similar vehicles. The directors are Fred O. Fox, W. G. Overman, John W. Van Allen, Julius Hengerer, Burwell S. Cutler, William C. Chadeayne and George McClure.

Dinner Given Morrison—A. E. Morrison, formerly manager of the Taxi-service Co., of Boston, but who resigned recently to go into business at San Francisco, was tendered a complimentary dinner by fellow members of the Bay State A. A. last Thursday evening. The dinner took place in the clubrooms and there were about fifty motorists present. Mr. Morrison announced that he is to have charge of the Studebaker branch on the coast.

Has a New Truck Idea—The Schaefer Co., of Berlin, Wis., manufacturer of gasoline motors, steel and malleable castings and gasoline locomotives for quarry railways, is working on the first model of a new type of gasoline motor delivery truck. The company now is building an addition to its foundry and machine shops to double the capacity, and intends to manufacture the truck on an extensive scale. The motor car repair departments become a big feature and orders are being received from all northwestern states. The concern operates its own casting furnaces.

Buy a Butler Garage—Paterson & Geisey, of Pittsburg, have bought the interest of S. M. Root in the Butler garage at Butler, Pa. Mr. Root will continue as Butler agent for the Pope-Hartford cars.

Dixie Company Organized—The Dixie Motor Co., of Jackson, Tenn., organized for the purpose of conducting a general motor car business, has completed organization and will be ready for business at an early date. The following officers and directors have been elected: C. E. Griffin, president; Dr. E. K. McNeil, vice-president; B. R. Person, secretary and treasurer; M. I. Best, B. C. Edenton, C. E. Pigford, T. M. Malden, C. E. Weis and F. M. Frankland.

Has Big Repair Shop—The Love Garage Co., of Columbus, O., recently incorporated, has been organized by the election of J. P. Love president and F. E. Love secretary and general manager. The announcement is made that the concern will occupy its new building on North High street by December 1. The structure will have 15,000 square feet of space and will be one of the largest repair shops in the city. In addition to the garage business the concern will have the White line, both steamer and gasoline.

Badger Brass Wins Suit—A decision handed down by the United States circuit court of the southern district of New York in the case of La Societe Besnard, Maris & Antoine and the Badger Brass Mfg. Co. against Herman Saxon, doing business under the name of the Manhattan Lamp Works, perpetually enjoins the defendants from infringing patent No. 841,799 granted to the French complainants and for which the Badger Brass Mfg. Co. is the exclusive licensee. The patent pertains to new and useful improvements in lamps.

The Motor Car Repair Shop

"DO you know," said an enthusiastic motorist to another, "I wouldn't drive my car on a rainy day without anti-skid devices on the rear wheels for love nor money. I did it once. When it got out on the shining asphalt boulevard, lubricated with water and the drippings of oil, the slipperyness of it all was most appalling. Can you remember the first time you put on a pair of roller or ice skates, or the first time you entered a strange drawing-room with its highly-polished floors and loose fur rugs; or did you ever step out onto the highly-polished floor of a ball room with a new pair of dancing shoes on your feet? Well, that is the way I felt as I glided over the slippery pavement. My brakes were absolutely useless, and I had to begin to slacken speed in the middle of every block in order to have the car under control at the crossings. By the time I reached the beginning of the business portion of the city I grew positively nervous, and decided to turn off in search of a less smooth but also less slippery street. As I swung cautiously around the corner I neglected to figure on the camber of the road surface, and having entered the street on the wrong side of the crest of the road the car slid gently but firmly into the curbing. I ordered a new wheel and a set of chains."

Hints to the Amateur

Makeshift Wheel Pullers

There are many repair shops in which a wheel puller of the standard type is a tool unheard of; and still the repair men in these shops often are required to remove road and gear wheels from motor cars, operations which without the use of a wheel puller or its equivalent, would be most laborious and sometimes impossible to accomplish. Cases of this kind tax the ingenuity of the workmen and many are the ways and means of the clever mechanic. In Fig. 1 a way is shown in which a very obstinate wheel was removed without any great waste of energy, or battering up of the shaft, hub, or spokes, as is often the result when a hammer is misused for the purpose. This makeshift wheel puller was made from two long bolts with nuts, and a short bolt and three pieces of iron obtained from the scrap pile. When applied to the wheel the two bolts B are put through the holes in the plates A, then through the end holes in the iron pieces C, which may be recognized as a piece of railroad iron used in binding rails together. The nuts are then placed on the protruding ends of the bolts; the plates are placed behind the spokes, and while holding the small short thick bolt D against the center of the iron piece C with one hand, and at the same time pulling out on the same to hold the plates B

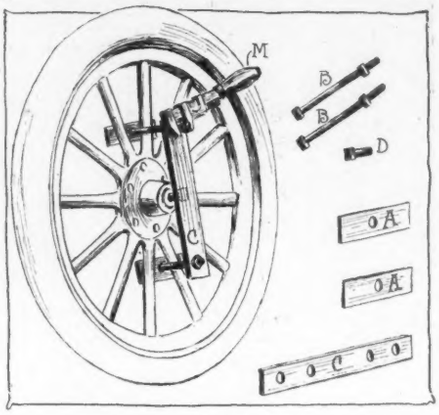


FIG. 1

in place behind the spokes; the nuts are screwed up with the other hand until the end of the short bolt comes into contact with the shaft of the wheel, and till they are tight enough to hold the outfit in place; a wrench is then used as illustrated, giving each nut a turn alternately, until the wheel loosens up.

Jack as a Wheel Puller

It once occurred while driving a high-grade car through the country that immediately after having covered a comparatively rough stretch of road at rather a fast clip, the characteristic noiselessness of the machine was disturbed by a grating in one of the rear wheels. The driver immediately diagnosed the case as being caused by a broken ball, but he was at a loss for a moment as to what to do about it. If the broken ball was not removed immediately the entire bearing might be ruined, whereas if it was removed and the chips cleaned out the journey might be continued with safety until another ball, or preferably a set of balls, could be obtained. The difficulty lay in the removal of the wheel. The driver had been aware of the looseness of the bearing for some time, but having been unable to remove the wheel from the shaft for the want of a wheel puller, the adjustment of the bearing had been neglected. The old adage that necessity is the mother of invention was soon borne out, however, and opening up the tool box, the jack, the air-bottle and a piece of rope was removed therefrom and laid near the distressed wheel. A short search brought forth a block of wood and a stone from the roadside, and these were placed before and behind the opposite rear wheel so that there would be no danger of the car moving backward or forward while the wheel was being removed. The jack was now placed under the hub of the wheel to be removed, and that side of the car was raised. The air bottle was now placed on end under the rear axle, and the axle lowered upon it. The rope and the jack was employed as shown in Fig. 2. Two strokes of the jack handle and the rope was drawn taut, another stroke and the wheel moved on the shaft, one more stroke, and presto! the wheel was loose. The jack now was also placed under the axle to add to its security while the wheel was removed; the wheel was taken off and the bearing exposed; as expected, a broken ball was found and removed, the bearing was adjusted, the wheel replaced and the journey continued.

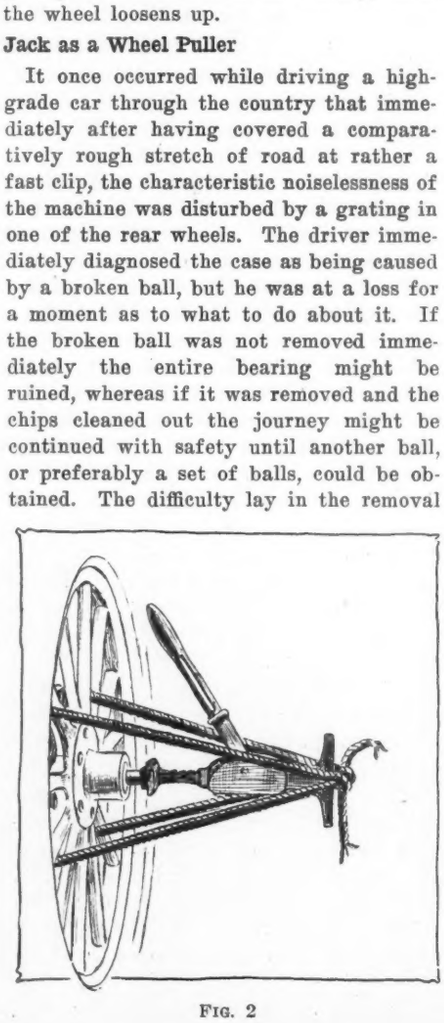


FIG. 2

Advancing the Spark

The moment of contact at the commutator and the flashing of the spark at the plug in the cylinder practically are instantaneous, but there is an appreciable time between the spark and the time the gas becomes completely ignited. When the motor is running at a high rate of speed, in order to have the explosion take place when the piston is just beginning its downward stroke, the spark must occur when the piston is on its way up. To make the spark occur at an earlier point in the revolution of the motor, is known as advancing the spark, and is controlled by a lever on the steering post or over the steering wheel which acts on the commutator or the make-and-break device of the magneto or both. If the motor is running at a low rate of speed and the spark is advanced too far it will cause the explosion before the piston has completed its upward stroke, and will create either a backward revolution of the crankshaft and stop or stall the motor, or it will make the motor knock or pound. When cranking the motor in starting, if the spark lever is not fully retarded it is liable to cause a backward revolution of the crankshaft and the kick of the starting lever might cause serious injury to the operator.

Development Briefs

FIG. 2—U. & H. HIGH-TENSION SWITCH

Traver's Non-Skid

THE Phillip C. Traver Mfg. Co., Far Rockaway, N. Y., has brought out a non-skid, in which the anti-skidding factors are curved pieces of double, hardened sheet steel, so located around the tire that not only do they present a non-skid surface for the ground but it is claimed they do so without any wearing surfaces against the tire. Attached to a tire the Travers non-skid resembles in general a tire chain, there being a dozen or more of the non-skid transverse plates across the tread secured by short linkages to a circumferential chain at each side of the tire. The curved surfaces of the transverse tread plates are hardened so that, it is said, a file will not hurt them. A feature in conjunction with this Traver's non-skid is a spring lock coupling in the circumferential chain which prevents these chains from becoming loose or rattling. Besides this non-skid the company manufactures a sectional one, based on the same principle but differing only in the matter of adjustment. In this each of the transverse tread clips is put on individually and held in one position by rubber-guarded chains which go on either sides of the spokes. A wheel may be equipped with as many or as few of the sectional chains as is desired by those who fit them to tires.

U. & H. High-Tension Switch

The J. S. Bretz Co., New York, has brought out a new high-tension switch, which is incorporated integrally with the coil box used in connection with U. & H. master magnetos when a dual ignition system is used. The coil, which is located on the dash, and illustrated in Fig. 2, is in use only when the battery system of ignition is used, as the U. & H. master magneto is of the high-tension type and does not require a step-up transformer coil. Referring to the coil for the dual system, with the switch in the proper position for magneto ignition, the coil is idle, but for starting on the battery the switch is in the position shown in Fig. 2, when the coil serves as a transformer coil.

FIG. 1—TRAVER'S NON-SKID

Dover Non-Spill Funnel

The Dover Stamping and Mfg. Co., Cambridge, Mass., has brought out a novel funnel which will prevent spilling of large quantities of gasoline when the fuel tank becomes filled and the funnel still remains half full. With the ordinary funnel in such an emergency the gasoline is wasted on the ground, but in the new type brought out by the Dover company a brass ball B is used which falls into an opening as soon as the funnel is lifted from the filler opening, thus preventing any of the gasoline escaping and allowing of it being poured back into the tank. The brass ball B operated through the four feet F to which the rod that the ball is fastened to passes. When the funnel is inserted in the opening the feet F contact first with the sides of the filler opening and the funnel due to its weight slips down, thus raising the ball B from its seating. In this position the gasoline can be poured. As soon, however, as the funnel is lifted by the side handle, the ball B returns to its seating and the spilling of gasoline is avoided and fuel economy is practiced. Fig. 3 is an illustration of this device.

FIG. 3—DOVER NON-SPILL FUNNEL

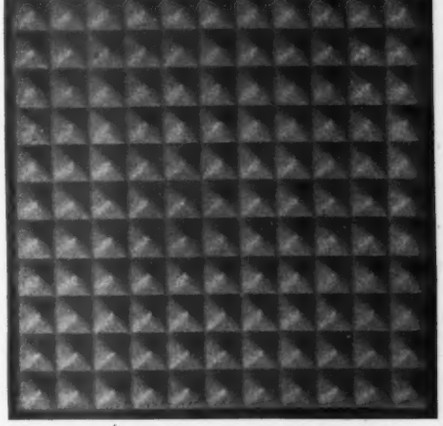


FIG. 4—ALUMINUM FLOOR COVERING

Aluminum Floor Covering

The Factory Sales Corporation, Chicago, is marketing a new floor covering for motor cars. It is stamped from special alloy sheet aluminum with pyramid surfaces and after stamping is sand blasted to give the appearance of cast aluminum. It is intended to be laid over the floor boards of the car. Special binding is used to secure it in place. It is furnished in sheets 36 inches wide by 85 inches long. An illustration of it is given in Fig. 4.

Binks Compound Air Pump

The Star Brass Works, Chicago, is marketing a new design known as model No. 2, Binks compound air pump, which is intended to take place of its former model, No. 1. This pump for tire inflation work is equipped with three valves, one of which is for preventing air from returning to the pump after being discharged, which fact takes a load off the cylinders, and making the pump work more easily than if it were equipped with but two valves. The cylinders in this pump are 4 by 5½ and 2¼ by 5. These cylinders are of polished seamless brass tubing.

Brief Business Announcements

Dover, Del.—The Delaware Garage Co., of Wilmington, has been incorporated with a capital stock of $100,000.

Buffalo, N. Y.—Swick & Pattison, of Niagara Falls, N. Y., will handle the Great Western during 1910.

Dover, Del.—Articles of incorporation have been filed by the Winter Automobile Co., of Dunmore, Pa. The company has a capital stock of $25,000.

Morristown, Pa.—The Chadwick Engineering Works, of Pottstown, engaged in the manufacture of cars, has increased its capital stock from $500,000 to $1,000,000.

Columbia, S. C.—Plans are being considered for the establishment of a motor line in Greenville. David Cardwell, Jr., and A. McI. Griffin are interested in the new scheme.

Brooklyn, N. Y.—Kenney Brothers, who have the local agency for the Rambler, have announced they expect to be located in their new quarters at Bedford avenue and Sterling place by December 1.

Philadelphia, Pa.—The local branch of the Studebaker company is now housed in its new quarters on North Eighteenth street, below Spring Garden street. The new building is 80 by 120 feet, and can easily accommodate 150 cars.

New York—The Victor Auto Storage Co., which for several years has been located at 147 West Fifty-seventh street, is planning to open a new salesroom where it will exhibit several models of the Columbia, for which it has the metropolitan agency.

Columbus, Neb.—The Columbus Automobile Co., of this city, is building a concrete garage 44 by 48 feet with front of pressed brick and plate glass, walls reinforced concrete, trussed roof and concrete floor. It handles the Reo, Overland, Velie and Kissel.

Los Angeles, Cal.—The Pioneer Auto Co., which is the agent in this city for the Reliance truck, is preparing plans for the erection of a garage to be used exclusively for the care of commercial motor trucks. The new garage, which is to be 200 by 70 feet, will be located at San Pedro and Market streets, and will be known as the Pioneer Commercial Auto Co.

Detroit, Mich.—The Acme Box Co. has been further reorganized, and in the future will be known as the Yeomans Body Box Co., and besides manufacturing boxes of all kinds will devote considerable of its attention to making motor car bodies of all kinds. A new factory is being erected on land which has been purchased adjoining the old plant, and the capital stock of the company has been increased from $75,000 to $150,000. Arthur Yeomans is to be president of the new company, and Alfred Fritzsche vice-president.

New York—The Auto Supply Co. has removed to the new building at Columbus circle and Broadway.

Atlanta, Ga.—The Pullman Auto Co. is about to open a southern branch at 10 Auburn avenue under the management of Captain Heidt.

Spokane, Wash.—Nite & Keena, local agents for the Packard, have opened a salesroom at 1022 First avenue, to be devoted exclusively to the interests of this machine. Edward B. Lane is to be manager of this branch.

Springfield, Ill.—The Universal Automobile League, of Phoenix, Ariz., has filed articles of incorporation under the laws of this state. It will have a capital stock of $10,000. Headquarters are to be established in Chicago.

Atlanta, Ga.—A deal has been consummated by which the Studebaker Automobile Co. has purchased the interest of G. W. Hansen and his associates in the Georgia Motor Car Co., and papers have been executed for the formation of a subsidiary company to the main Studebaker concern which will constitute a branch of that company with headquarters in Atlanta, Ga. The territory which the branch will control will comprise the two Carolinas, Georgia and Florida. Mr. Hansen will continue as manager of the concern.

Denver, Colo.—E. R. Cumbs, who is the local agent for the Rambler and Mitchell cars, has opened a new salesroom.

Brooklyn, N. Y.—Walter Livingston has joined the forces of Bishop, MacCormack & Bishop, the local agents for the Ford car.

Syracuse, N. Y.—James A. Leamy & Co. have been granted the contract for the erection of a new plant on Grape street for the Brennan Motor Co.

St. Louis, Mo.—The Petrie-Phillips Automobile Co., which has been appointed local agent for the Parry, has opened salesrooms at 1127 Olive street.

Aberdeen, Miss.—The Aberdeen Automobile Co. has just leased a garage on North Meridian street, and will move into its new quarters within the next few days.

Seymour, Conn.—The H. A. Matthews Co., maker of motor car and bicycle parts, is erecting an addition to its plant, two stories in height, 102 by 60 feet, which is to be devoted almost exclusively to the making of motor car parts.

Houston, Tex.—The Houston Motor Car Co. has taken over the local representation of the Oldsmobile and Oakland cars, the Oldsmobile Automobile Co. having given up the retail agency for these cars and devoting all its attention to the wholesale end of the business.

Pittsburg, Pa.—S. W. Fisher, local manager for the Croxton-Keeton Motor Co., has just returned from a visit to the company's factory at Massillon, O., where he has made arrangements for the establishment of two new agencies, one at Johnstown and the other at Altoona.

Buffalo, N. Y.—The Brunner Motor Car Co. has been recently incorporated in Buffalo. The capital stock of the concern is $14,000. Joseph B. Schmitt is erecting a garage at 1641 Genesee street, Buffalo. The Enterprise Automobile Supply Co. has been incorporated in Buffalo with a capital of $5,000. The directors are: A. B. Newman, Charles Kuhn, and William H. Watson.

St. Louis, Mo.—The General Motor Car Co., Ltd., of St. Louis, has been incorporated and for the present will have its offices in the Third National Bank building. J. H. Hutchinson is to be the president of the new company, H. C. Gottfried vice-president, and C. H. Smith secretary. The company, which plans to open extensive salesrooms in the near future, is to look after the interests of the Hupmobile and the Chase.

Recent Incorporations

Chicago—Jones Taximeter Co., of Chicago, capital stock $20,500; to manufacture and deal in taxicabs and other vehicles. Incorporators, A. R. Hurburt, S. S. Gorham and H. H. Wales.

Chicago—Union Motor Car Co., capital stock $4,000; to do a general garage business. Incorporators, W. F. Muehl, P. F. Sweeney and Kate Sweeney.

Buffalo, N. Y.—Brunner Car Co., capital stock $14,000; to manufacture and deal in motor cars, boats and vehicles. Incorporators, B. S. Morden, A. L. Dixon and C. P. Miller.

Buffalo, N. Y.—Greyhound Motor Works, capital stock $100,000; to manufacture horseless vehicles, motors, engines, motor cycles, aeroplanes, etc. Incorporators, F. P. Fox, W. C. Overman and John W. Van Allen.

Hoboken, N. J.—American Inner Tube Co., capital stock $500,000; to engage in the manufacture of inner tubes, etc. Incorporators, H. O. Coughlan, S. A. Anderson and John W. Stout.

Camden, N. J.—Central Machine Works, Inc., capital stock $100,000; to manufacture machinery of all kinds, motors, etc. Incorporators, Frank Apgar, Charles Baney and J. C. Dunn.

Chicago—Invincible Storage Battery Co., capital stock $5,000; to manufacture and deal in electric generating machinery, motor vehicles, and also furnish electricity.

Taylorsville, Ill.—Christian County Motor Sales Co., capital stock $2,500; to engage in a general motor garage business. Incorporators, Ernest Hoover, E. W. Davis and G. F. Shumway.